

DEPARTMENT OF THE ARMY
Wilmington District, Corps of Engineers
Post Office Box 1890
Wilmington, North Carolina 28402-1890

Action ID No. 199700360

March 11, 2004

PUBLIC NOTICE

THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION (NCDOT), C/O DR. GREGORY J. THORPE, PHD, MANAGER, PROJECT DEVELOPMENT AND ENVIRONMENTAL ANALYSIS BRANCH, 1548 MAIL SERVICE CENTER, RALEIGH, NORTH CAROLINA, 27699-1548 HAS APPLIED FOR A DEPARTMENT OF THE ARMY (DA) PERMIT PURSUANT TO SECTION 404 OF THE CLEAN WATER ACT TO DISCHARGE DREDGED OR FILL MATERIAL INTO WATERS OF THE UNITED STATES, INCLUDING JURISDICTIONAL WETLANDS FOR THE WIDENING OF THE EXISTING U.S. 421 TWO-LANE FACILITY TO A FOUR-LANE, GRASSED MEDIAN, DIVIDED HIGHWAY BEGINNING AT THE INTERSECTION OF THE EXISTING SR-1007 (PLANK ROAD) AT GULF TO THE EXISTING FOUR LANE ROADWAY NORTH OF SR 2210 (CARTER-BROOKS ROAD) SOUTH OF SILER CITY, IN CHATHAM COUNTY, NORTH CAROLINA. STATE PROJECT 6.529005T, TIP NO. R-2610, NCDOT DIVISION 8.

The following description of the work is taken from data provided by the applicant and from observations made during site visits by representatives of the Corps of Engineers.

History:

The North Carolina Department of Transportation (NCDOT) State Environmental Assessment (SEA) describing this project was approved by NCDOT on April 30, 1998 and a State Finding of No Significant Impact (SFONSI) determination was prepared for this project on February 24, 1999. The purpose of the proposed project, as stated in the SEA, is to improve safety and capacity on the US 421 corridor (R-2610).

The NCDOT SEA and SFONSI are available for review at the Wilmington Regulatory Field Office of the Wilmington District U.S. Army Corps of Engineers, 69 Darlington Avenue, Wilmington, North Carolina, or at the North Carolina Department of Transportation, Project Development and Environmental Analysis Branch, Transportation Building, 1 South Wilmington Street, Raleigh, North Carolina.

Project Description:

The work now being considered for authorization is the discharge of dredged or fill material into 0.26 acres of jurisdictional wetlands and 2,354 linear feet or 0.33 acres of jurisdictional stream channel associated with the widening of U.S. 421. The U.S. 421 highway improvement project will involve widening on the west side of the existing two-lane facility to a four-lane, grassed median, divided highway with 10-foot grassed shoulders beginning at the intersection of the existing SR-1007 (Plank Road) at Gulf to the existing four lane roadway north of SR 2210 (Carter-Brooks Road) south of Siler City. The proposed highway improvement project is approximately 12.1 miles in length

The project is located in the Cape Fear River Basin (Hydrologic Unit 03030003). Waters of the United States, including wetlands will be impacted by the proposed project. Major streams that may be impacted by the proposed project are Deep River, Cedar Creek, Bear Creek, Sandy Branch, Tick Creek, and Welch Branch. There are 19 proposed stream crossings associated with the proposed project (see Table 1). Wetland types potentially impacted by the proposed project are 0.26 acres of palustrine forested wetlands as shown in Table 1.

Table 1. Impacts to Aquatic Features from Proposed Project

Feature	R-2610 (Sections)		
	A	B	Total
Number of Streams	6	13	19
Streams (Feet)	655 (0.11Ac)	1699 (0.22Ac)	2354 (0.33Ac)
Ponds (Acres)	0	0	0
Palustrine Bottomland Forest Wetlands (acres)	Riverine	0	0.15
	Non-riverine	0.11	0
Note: Areas and lengths are based on Preliminary Design			

Construction of the proposed project will permanently impact 0.26 acres of jurisdiction wetlands and 2354 linear feet or 0.33 acres of stream channel. The proposal will also temporarily impact 0.02 acres of stream channel. The NCDOT is proposing to use onsite mitigation opportunities and the North Carolina Ecosystem Enhancement Program (EEP) to provide the necessary compensatory mitigation for the unavoidable wetland and stream impacts associated with this project. The proposed compensatory mitigation for 2354 feet of perennial stream impacts is summarized below:

1. Natural channel design and relocation of 217 linear feet of stream impacted within Site 5 of R-2610A at a mitigation ratio of 1:1.
2. Compensatory mitigation is proposed to consist of mitigation provided by the EEP for the remaining 2137 linear feet of stream impacts and 0.15 acres of riverine and 0.11 acres of non-riverine wetland impacts.

The State of North Carolina will review this public notice to determine the need for the applicant to obtain any required State authorizations. No Department of the Army (DA) permit will be issued until the coordinated State viewpoint on the proposal has been received and reviewed by this agency, nor will a Department of the Army permit be issued until the North Carolina Division of Water Quality has determined the applicability of a Water Quality Certification as required by PL 92-500.

This application is being considered pursuant to Section 404 of the Clean Water Act (33 U.S.C. 1344). Any person may request, in writing within the comment period specified in the notice, that a public hearing be held to consider this application. Requests for public hearing shall state, with particularity, the reasons for holding a public hearing.

The District Engineer has consulted the latest published version of the National Register of Historic Places (NHRP) for the presence or absence of registered properties, or properties listed as being eligible for inclusion therein. The J.M. Haughton-McInver House is located in the vicinity of the proposed highway project. However, the property boundary is located outside of the proposed highway right-of-way and the highway Area of Potential Effect (APE). The North Carolina State Historic Preservation Office (SHPO) concurred with the determination that the highway project would not have an effect on this listed historic site on March 19, 1998. There are two additional historic sites or properties that are located within the vicinity of the highway project that are potentially eligible for listing in the NRHP, the Gulf Historic District and the Henry Webster Farm Complex. Both of these properties are located outside the identified permit area and would not be affected by the proposed permit action.

The NCDOT has identified two potential archaeological sites within the proposed highway project area. Both sites were determined by the Corps of Engineers to be located outside the identified permit area and would not be affected by the proposed permit action. Furthermore, one of the sites was determined to be outside the highway APE and the second site was investigated and no artifacts were recovered within the proposed highway right-of-way. NCDOT determined that the proposed highway project would not affect either site. Consultation of the National Register and review of the above referenced NEPA documents and supplied correspondence from NCDOT constitutes the extent of cultural resource investigations by the District Engineer, and he is otherwise unaware of the presence of any other resources.

NCDOT has conducted surveys along the proposed project corridors to identify suitable, or critical habitat for species listed as Federally endangered or threatened pursuant to the Endangered Species Act of 1973. Based on information provided by NCDOT, the Corps of Engineers has determined that the proposed permit action would have no effect on three of the listed species known to occur within Chatham County (bald eagle, *Haliaeetus leucocephalus*; red-cockaded woodpecker, *Picoides borealis*; Harperella, *Ptilimnium nodosum*). However, some of the project area streams may offer potential habitat to the Cape Fear Shiner, *Notropis mekistocholas*. In order to avoid adverse effects to the Cape Fear Shiner, High Quality Water (HQW) erosion control standards will be utilized by NCDOT for the construction of the highway project. Furthermore, a time of year restriction is proposed for the clearing and grubbing work adjacent to Bear Creek. Clearing and grubbing within 100 meters (328 Feet) of Bear Creek will

only be performed during the period between April 15th and November 15th of any year. Based on the mitigation measures identified above, the U.S. Fish and Wildlife Service, in a letter dated March 10, 1998, concurred that the highway project is not likely to adversely affect the Cape Fear Shiner. The District Engineer, based on available information, is not aware that the proposed activity will affect any other species not listed above, or their critical habitat, designated as endangered or threatened pursuant to the Endangered Species Act of 1973.

The decision whether to issue a permit will be based on an evaluation of the probable impacts, including cumulative impacts, of the proposed activity and its intended use on the public interest. Evaluation of the probable impacts that the proposed activity may have on the public interest requires a careful weighing of all those factors that become relevant in each particular case. The benefits that reasonably may be expected to accrue from the proposal must be balanced against its reasonably foreseeable detriments. The decision whether to authorize a proposal, and if so the conditions under which it will be allowed to occur, are therefore determined by the outcome of the general balancing process. That decision should reflect the national concern for both protection and utilization of important resources. All factors that may be relevant to the proposal must be considered including the cumulative effects thereof. Among those are conservation, economics, aesthetics, general environmental concerns, wetlands, cultural values, fish and wildlife values, flood hazards and flood plain values (in accordance with Executive Order 11988), land use, navigation, shore erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs, considerations of property ownership, and, in general, the needs and welfare of the people. For activities involving the placement of dredged or fill materials in waters of the United States, a permit will be denied if the discharge that would be authorized by such permit would not comply with the Environmental Protection Agency's 404(b)(1) guidelines. Subject to the preceding sentence and any other applicable guidelines or criteria, a permit will be granted unless the District Engineer determines that it would be contrary to the public interest.

The Corps of Engineers is soliciting comments from the public; Federal, State and local agencies and officials; Indian Tribes and other interested parties in order to consider and evaluate the impacts of this proposed activity. Any comments received will be considered by the Corps of Engineers to determine whether to issue, modify, condition or deny a permit for this proposal. To make this decision, comments are used to assess impacts on endangered species, historic properties, water quality, general environmental effects and the other public interest factors listed above. Comments are used in the preparation of an Environmental Assessment (EA) and/or an Environmental Impact Statement (EIS) pursuant to the National Environmental Policy Act (NEPA). Comments are also used to determine the need for a public hearing and to determine the overall public interest of the proposed activity.

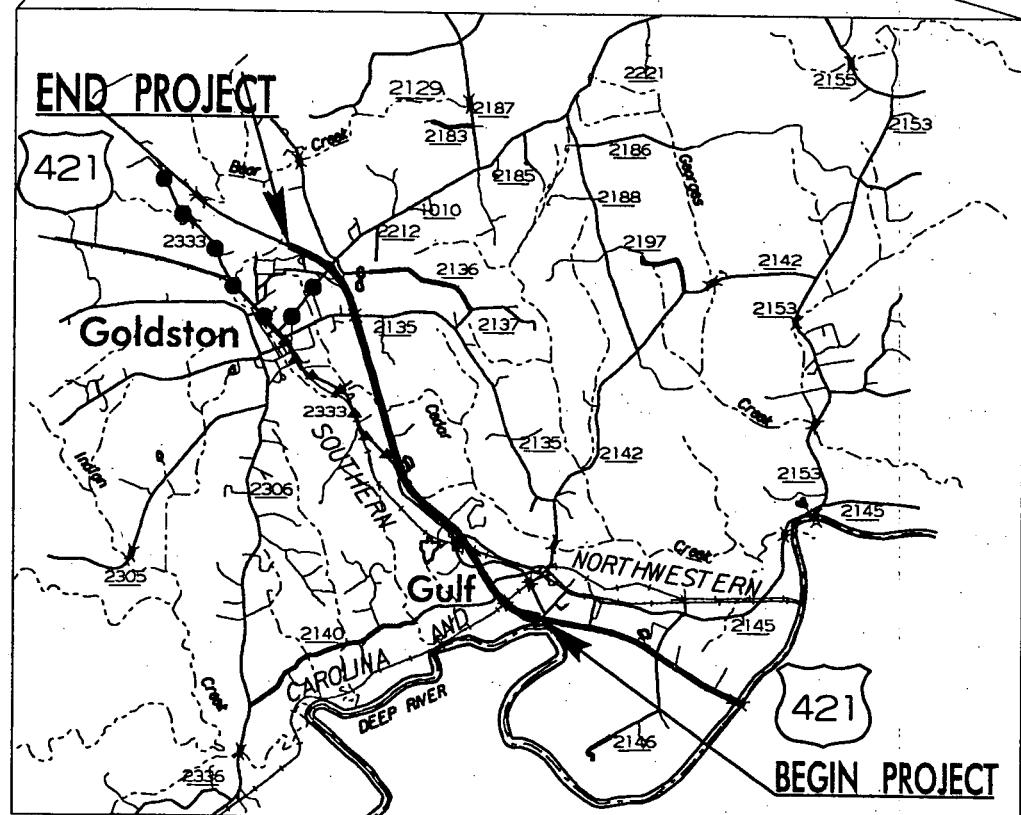
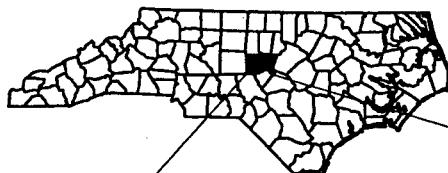
Generally, the decision whether to issue this Department of the Army (DA) permit will not be made until the North Carolina Division of Water Quality (NCDWQ) issues, denies, or waives State certification required by Section 401 of the Clean Water Act. The NCDWQ considers whether or not the proposed activity will comply with Sections 301, 302, 306, and 307 of the Clean Water Act. The application and this public notice for the Department of the Army (DA) permit serves as application to the NCDWQ for certification.

Additional information regarding the Clean Water Act certification may be reviewed at the offices of the Environmental Operations Section, North Carolina Division of Environmental Management (NCDEM), Salisbury Street, Archdale Building, Raleigh, North Carolina. Copies of such materials will be furnished to any person requesting copies upon payment of reproduction costs.

All persons desiring to make comments regarding the application for Clean Water Act certification should do so in writing delivered to the North Carolina Division of Water Quality, (NCDWQ), 1650 Mail Service Road, Raleigh, North Carolina 27699-1650, Attention: Mr. John Dorney.

Written comments pertinent to the proposed work, as outlined above, will be received in this office, Attention: Mr. Richard K. Spencer, until 4:30 p.m., April 12, 2004.

VICINITY MAP



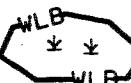
N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

CHATHAM COUNTY

1/12/01 10:45:56 AM (PST)

LEGEND

 WLB — WETLAND BOUNDARY

 WETLAND

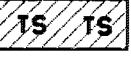
 DENOTES FILL IN WETLAND

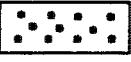
 DENOTES FILL IN SURFACE WATER

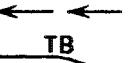
 DENOTES FILL IN SURFACE WATER (POND)

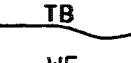
 DENOTES TEMPORARY FILL IN WETLAND

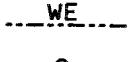
 DENOTES EXCAVATION IN WETLAND

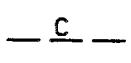
 DENOTES TEMPORARY FILL IN SURFACE WATER

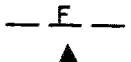
 DENOTES MECHANIZED CLEARING

 FLOW DIRECTION

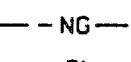
 TB — TOP OF BANK

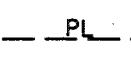
 WE — EDGE OF WATER

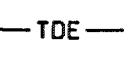
 C — PROP. LIMIT OF CUT

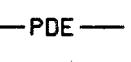
 F — PROP. LIMIT OF FILL

 ▲ — PROP. RIGHT OF WAY

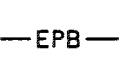
 NG — NATURAL GROUND

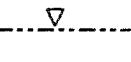
 PL — PROPERTY LINE

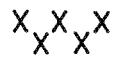
 TDE — TEMP. DRAINAGE EASEMENT

 PDE — PERMANENT DRAINAGE EASEMENT

 EAB — EXIST. ENDANGERED ANIMAL BOUNDARY

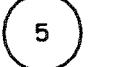
 EPB — EXIST. ENDANGERED PLANT BOUNDARY

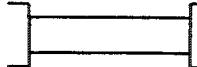
 ▽ — WATER SURFACE

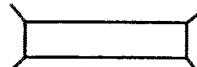
 LIVE STAKES

 BOULDER

 COIR FIBER ROLLS

 ADJACENT PROPERTY OWNER OR PARCEL NUMBER

 PROPOSED BRIDGE

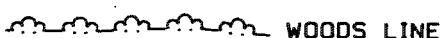
 PROPOSED BOX CULVERT

 PROPOSED PIPE CULVERT

(DASHED LINES DENOTE EXISTING STRUCTURES)



SINGLE TREE



WOODS LINE



DRAINAGE INLET



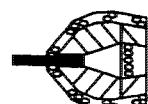
ROOTWAD



VANE



RIP RAP



RIP RAP ENERGY DISSIPATOR BASIN

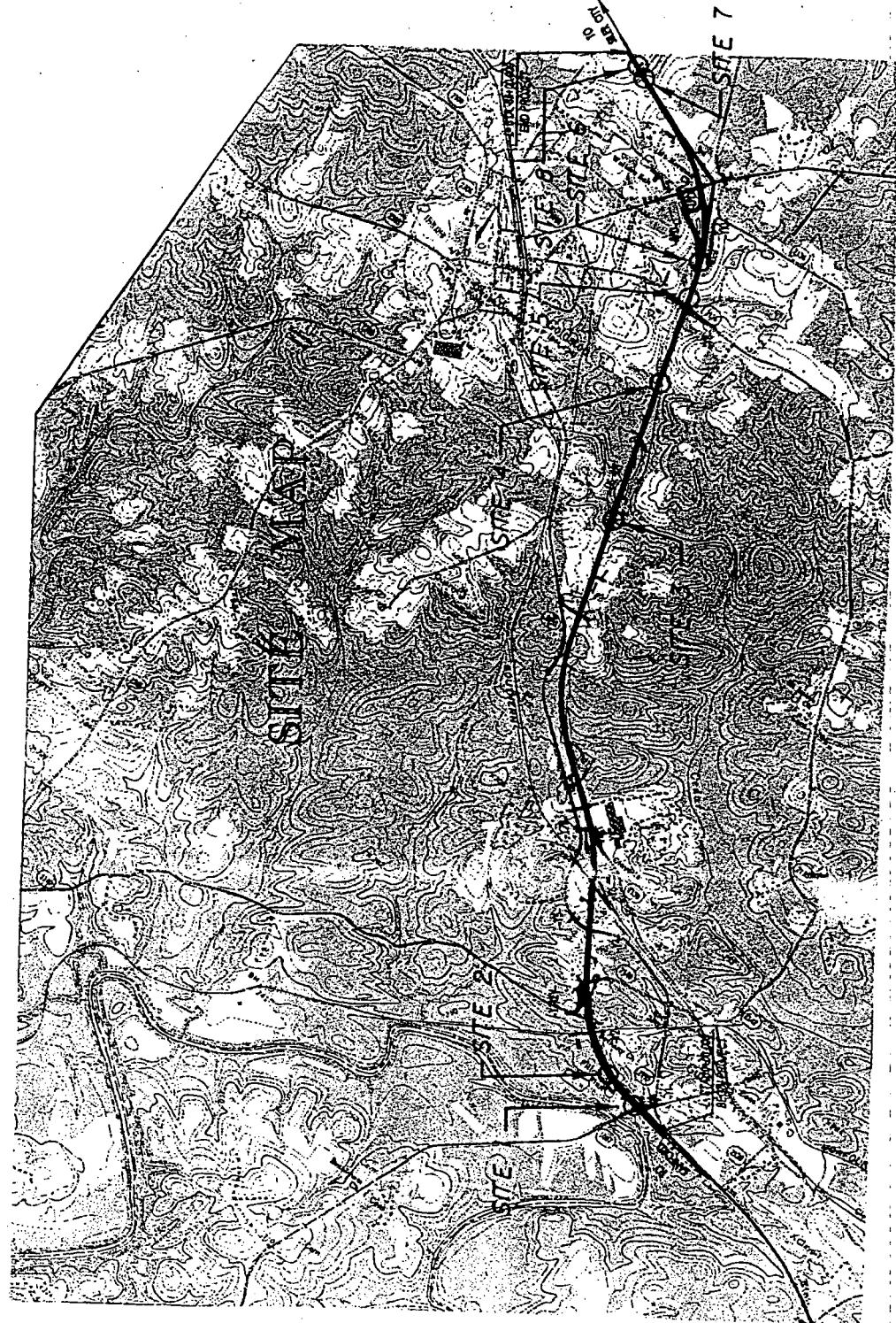
BUFFER ZONE

BUFFER ZONE

N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

CHATHAM COUNTY

PROJECT: 6.529005T (R-2610A)



N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
CHATHAM COUNTY
PROJECT: 6.529005T (R-2610A)

SHEET 3 OF 15

6/19/01

4

ROSS GERALD TAYLOR

EXISTING R/W

REPAIR ERODED BANK
 PLACE 53 M TONS
 CLASS "I" RIPRAP
 62M² FILTER FABRIC

EXTEND EXIST. RCBC
 1.8m X 1.8m

13+00

2-GI

13+60

F.S.

14m-375 RCP

84m-375 RCP

HEAVY
 DUTY
 2-GI

EXTEND EXIST. RCBC
 1.8m X 1.8m

EXISTING R/W

F F

C
A

3

C

BRISTOL GROUP L.L.C.
 (BRIAN D. JEDWAB)

N. C. DEPT. OF TRANSPORTATION
 DIVISION OF HIGHWAYS

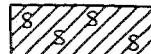
PLAN VIEW

5 0 10

SITE 1

CHATHAM COUNTY

PROJECT: 6.529005T (R-2610A)



DENOTES FILL IN
 SURFACE WATERS

SHEET 4 OF 15

6/19/01

27m-600 RCP
CL IV W/
METHOD B
INSTALLATION
F

F F

(6) MARGARET J. ELLIS

EXISTING R/W

CONC.
COLLAR

16+00

16+80

PLAN VIEW
SITE 2

SW 800
CONC
COLLAR

SCALE
5 0 10

DENOTES FILL IN
WETLAND

MODIFIED EXPWY. GTR.

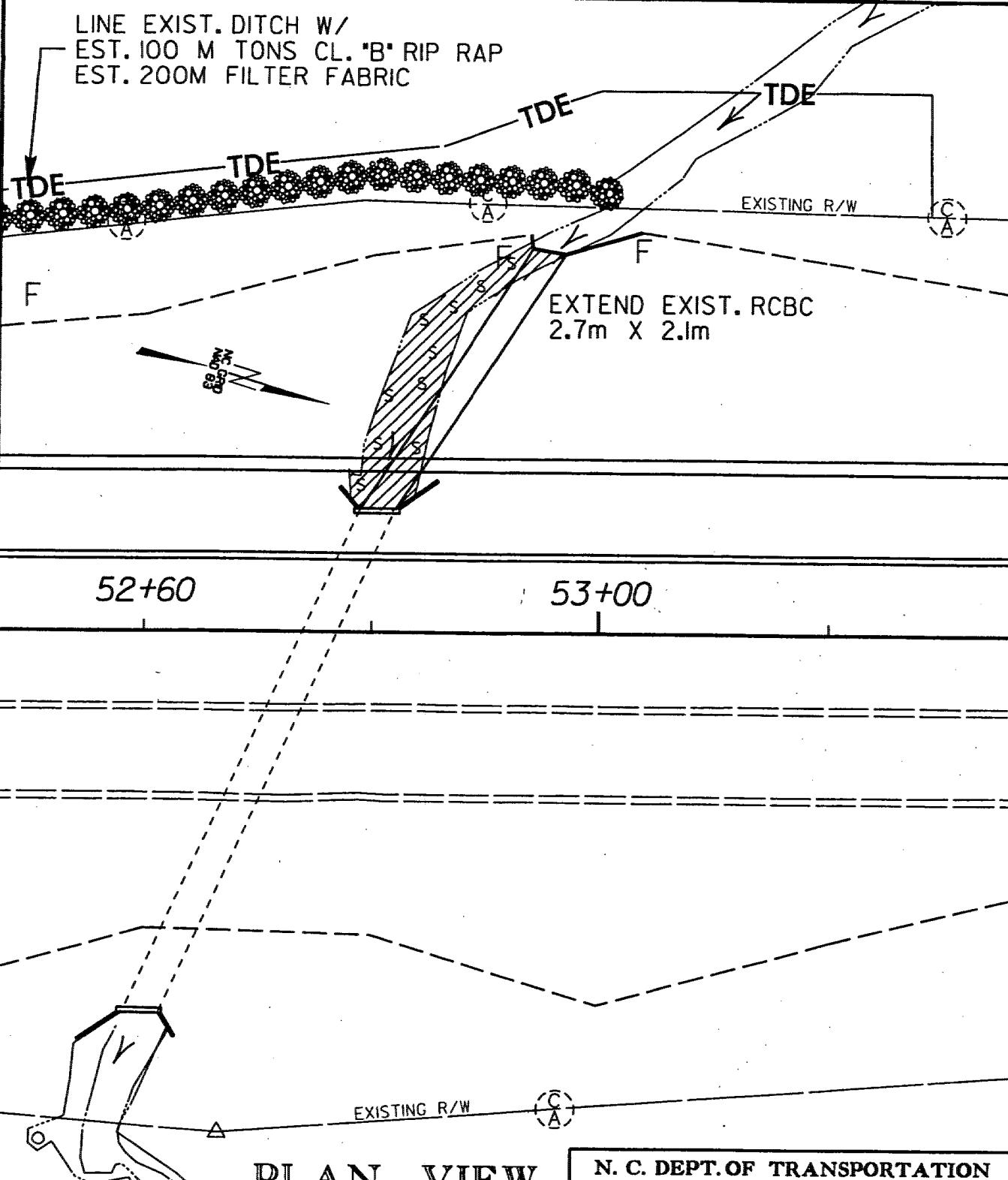
N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

CHATHAM COUNTY

PROJECT: 6.529005T (R-2610A)

SHEET 5 OF 15 6/19/01

LINE EXIST. DITCH W/
EST. 100 M TONS CL. "B" RIP RAP
EST. 200M FILTER FABRIC



PLAN VIEW
SITE 3

5 0 10
SCALE



DENO.
SURFACE WATERS

N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

CHATHAM COUNTY

PROJECT: 6.529005T (R-2610A)

EXISTING R/W

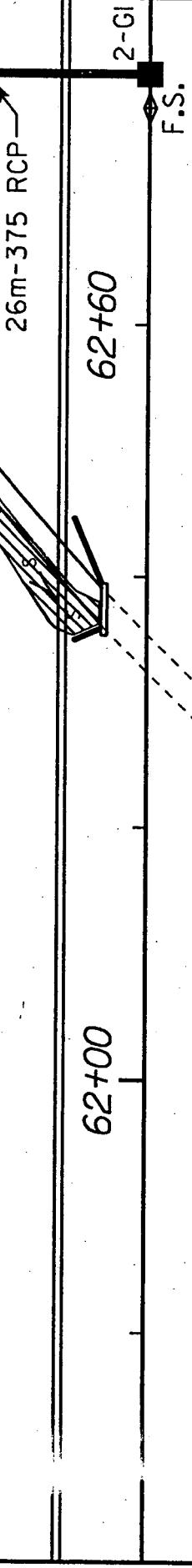
(E)

EXISTING R/W

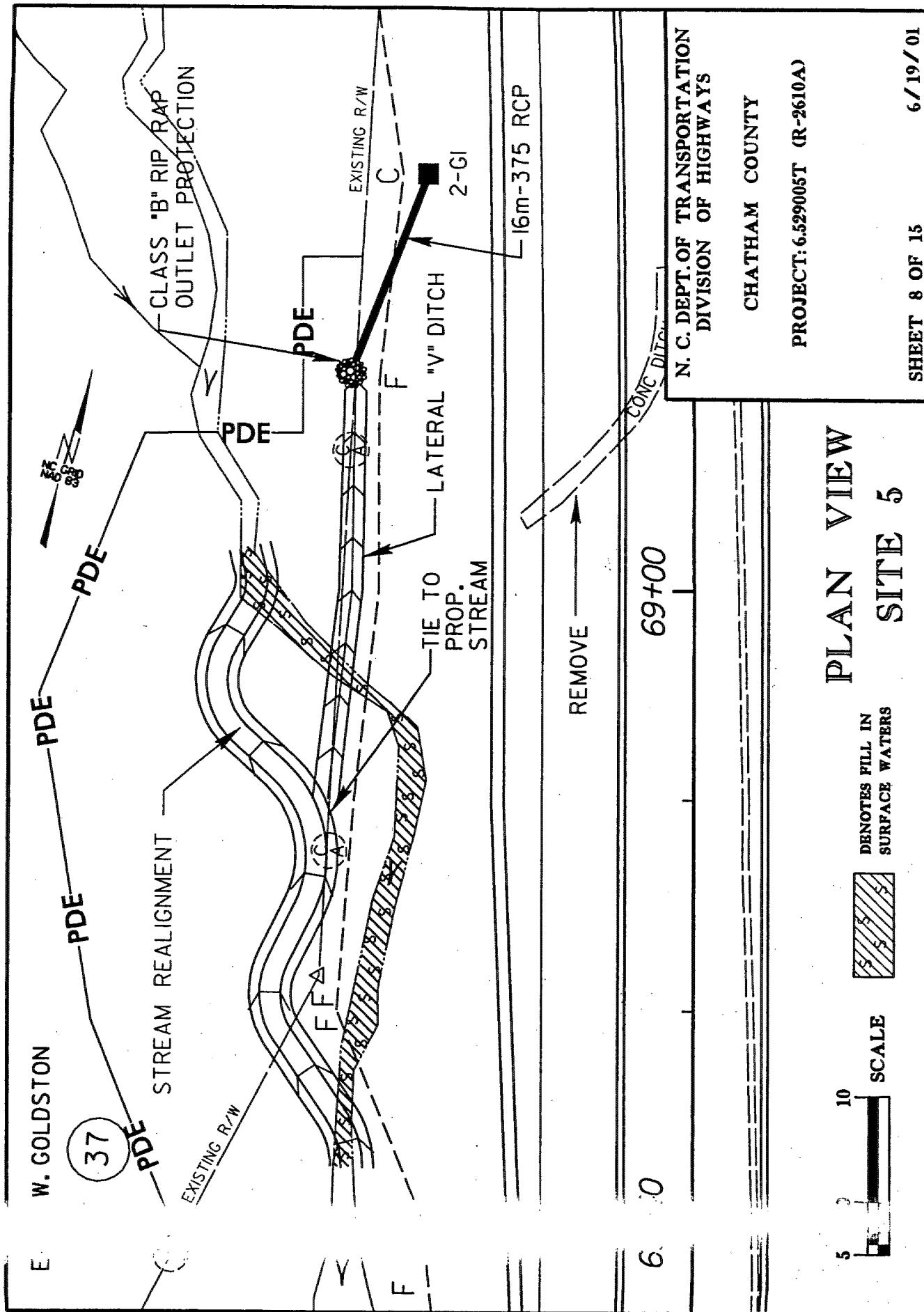
LATERAL BASE DITCH

EXTEND EXIST. RCBC
2.1m X 2.1m

NC
NGD
63



SHEET 7 OF 15 6/19/01



Morphological Measurement Table

NCDOT Project : R-2610A Chatham County US 421
 Restoration Site: -L- 68+45 lt to -L- 69+04 lt (UT to Cedar Creek)
 Reference Reach: -L- 68+45 lt to -L- 69+80 lt (UT to Cedar Creek)

Variables	Existing Stream	Proposed Reach	USGS Station	Reference Reach
Stream Name	Trib. To Cedar Creek -L- Sta 68+45lt to 69+80lt	Trib. To Cedar Creek -L- Sta 68+45lt to 69+04lt	None Available	(Same as existing stream)
Stream Type	CS upper reach	CS		
Drainage Area	0.26 sq. mi.	0.26 sq. mi.		
Bankfull Width	11 ft.	11 ft.		
Bankfull Mean Depth	0.8 ft	0.9 ft		
Width / Depth Ratio	13	12		
Bankfull Xsection Area	9 sq ft	10 sq ft		
Bankfull Mean Velocity	5.0 ft/sec	5.0 ft/sec		
Bankfull Discharge	45 cfs	45 cfs		
Bankfull Max Depth	1.3 ft	1.3 ft		
Width Flood Prone Area	20 ft	43 ft		
Entrenchment Ratio	1.8	2.5		
Meander Length	72 ft	88 ft		
Ratio of Meander Length to Bankfull Width	6.5	8		
Radius of Curvature	29 ft	27 ft		
Ratio of Radius of Curvature to Bankfull Width	2.6	2.5		
Belt Width	23 ft	19 ft		
Meander Width Ratio	2.1	1.7		
Sinuosity - Stream Length / Valley Length	1.1	1.1		
Valley Slope	.019 ft/ft	.018 ft/ft		
Average Stream Slope	.018 ft/ft	.016 ft/ft		
Pool Slope	.0047 ft/ft	.0058 ft/ft		
Ratio of Pool Slope to Average Slope	0.26	0.36		
Maximum Pool Depth	3.3 ft	2.5 ft		
Ratio of Average Pool Depth to Average Bankfull Depth	1.9 / 0.8	2.1 / 0.9		
Pool Width	2.4	2.3		
Ratio of Pool Width to Bankfull Width	1.3	1.3		
Pool to Pool Spacing	46	45		
Ratio of pool to pool spacing to bankfull width	4.2	4.1		

Materials:	Existing Channel	Proposed Reach	USGS Gage Station	Reference Reach
Particle Size Distribution of Channel Material (mm)				
D10	0.1	0.1		
D35	0.3	0.3		
D50	1.0	1.0		
D84	22.0	22.0		
D95	77.0	77.0		
Particle Size Distribution of Bar Material				
D10	N/A for sandbed	N/A for sandbed		
D35	N/A for sandbed	N/A for sandbed		
D50	N/A for sandbed	N/A for sandbed		
D84	N/A for sandbed	N/A for sandbed		
D95	N/A for sandbed	N/A for sandbed		
Largest Size Particle on Bar	N/A for sandbed	N/A for sandbed		

Sediment Transport:	Existing	Proposed	USGS Gage Station	Reference Reach
Sediment Transport Validation (Based on Bankfull Shear Stress)				
Movable Particle Size at Bkf Shear Stress from Shields Curve (mm)	60	55		
Computed Bkf Shear Stress, T=GRS (lb/ft ²)	0.90	0.85		
Critical dimensionless shear stress	N/A for sandbed	N/A for sandbed		
Minimal mean dbcf (f) calculated using critical dimensionless shear stress equations	N/A for sandbed	N/A for sandbed		

NCDOT Project R-2610A Chatham County US 421
 Restoration Site -L- 68+45 It to -L- 69+04 It (UT to Cedar Creek)
 Reference Reach -L- 68+45 It to -L- 69+80 It (UT to Cedar Creek)

SEDIMENT TRANSPORT ANALYSIS

Method 1 - Flow data from a single cross section

Station/Description	Avg Flow Depth (ft)	Slope (ft/ft)	Hyd. Rad.	Shear Stress (lb/ft ²)	Bed Material	Vel (ft/s)
Proposed	1.1	0.0180	0.8	0.889	Sand/Gravel	4.9
Reference	1.2	0.0180	0.8	0.913	Sand/Gravel	5.0

Method 2 Shields Diagram / HEC15

** Critical Shear Stress 0.05 lb/ft² for D50 of 1 mm at proposed site
 *** Permissible Velocity 3.0 - 5.0 ft/s Sand / Gravel

Method 3 Shields Dimensionless Shear Stress Equation for proposed average channel sections

Particle Size	<u>1.0</u>	mm	for D50 of 1 mm at proposed site
Particle Size	<u>0.039</u>	in	
Dimensionless Shear Stress	<u>2.5243</u>	lb/ft ²	
Kinematic Viscosity	<u>0.00001400</u>	ft ² /s	at 50°F
Mass Density	<u>1.94</u>	slugs/ft ³	
Unit Weight (Particle)	<u>165.0</u>	lb/ft ³	
Unit Weight (Water)	<u>62.4</u>	lb/ft ³	
Reynolds Number	<u>155.1</u>		

Dimensionless Critical Shear Stress = 0.050 lb/ft² therefore particle will move since .05 < 0.9

References:

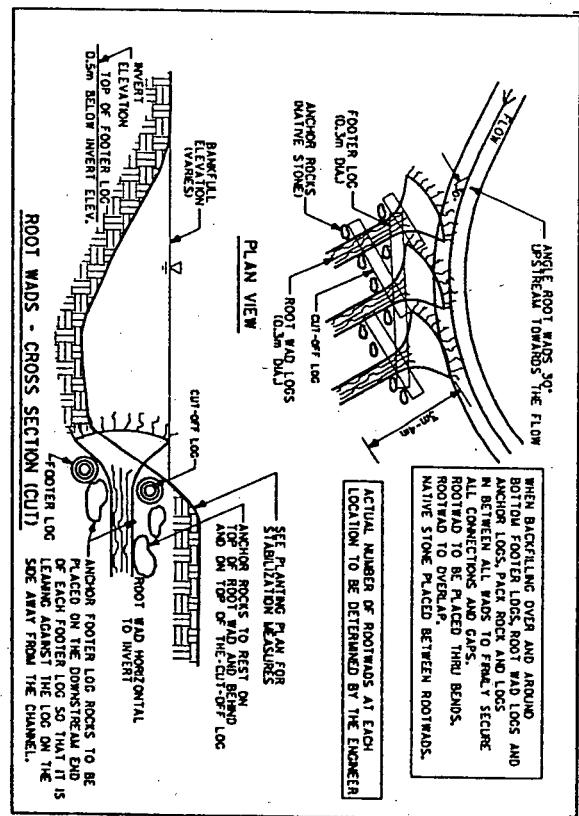
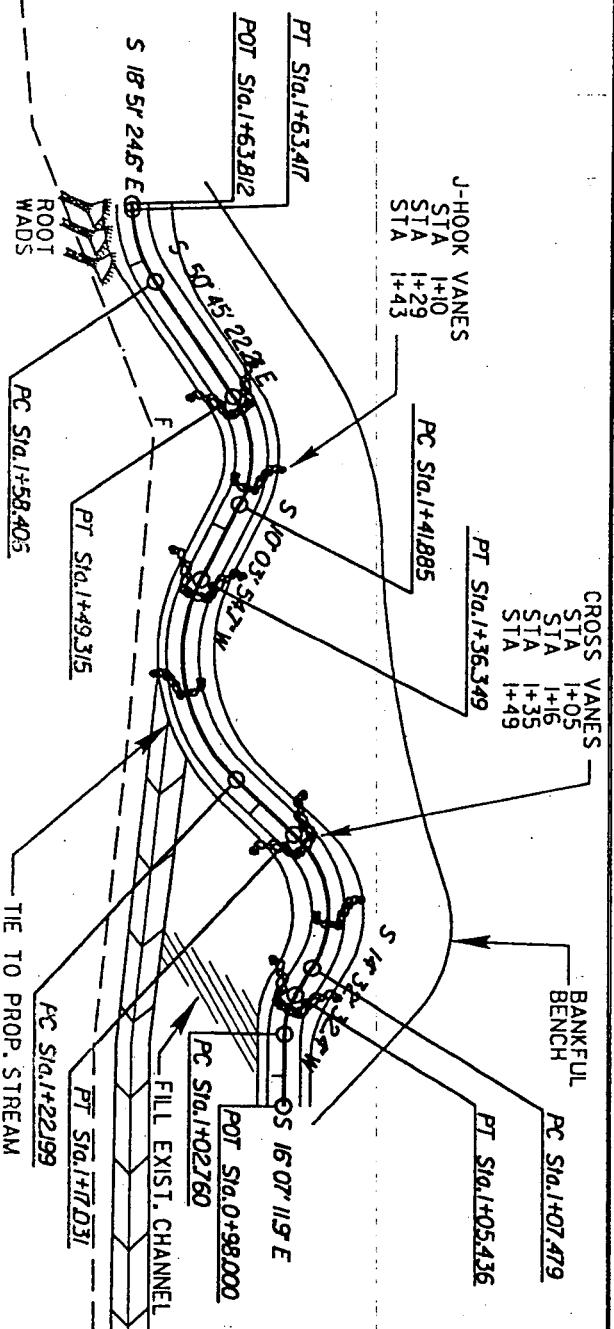
- * Shields Diagram
- ** Hydraulic Engineering (HEC) 15 - Chart 1
- *** NCDENR Erosion and Sediment Control Planning and Design Manual

Method 4 Dimensionless ratios for average channel cross sections

<u>Proposed</u>		<u>Reference</u>	
Q_{BKF}	<u>45.0</u> ft ³ /s	Q_{BKF}	<u>45.0</u> ft ³ /s
W/D	<u>12.0</u>	W/D	<u>13.0</u>
Mannings n	<u>0.035</u>	Mannings n	<u>0.035</u>
Valley Slope	<u>0.0180</u> ft/ft	Valley Slope	<u>0.0190</u> ft/ft
Avg Stream Slope	<u>0.0160</u>	Avg Stream Slope	<u>0.0180</u>
Sinuosity	<u>1.1</u>	Sinuosity	<u>1.1</u>
Valley Slope/Sinuosity	<u>0.0160</u> ft/ft	Valley Slope/Sinuosity	<u>0.0180</u> ft/ft
Velocity	<u>5.0</u> ft/s	Velocity	<u>5.0</u> ft/s
Area	<u>10.0</u> ft ²	Area	<u>9.0</u> ft ²
W_{BKF}	<u>11.0</u> ft	W_{BKF}	<u>11.0</u> ft
Mean Depth	<u>0.9</u> ft	Mean Depth	<u>0.8</u> ft
Wetted Perimeter	<u>11.8</u> ft	Wetted Perimeter	<u>11.2</u> ft
Hydraulic Radius	<u>0.85</u> ft	Hydraulic Radius	<u>0.80</u> ft
Shear Stress	<u>0.85</u> lb/ft ²	Shear Stress	<u>0.90</u> lb/ft ²
Particle Moved	<u>55.0</u> mm	Particle Moved	<u>60.0</u> mm
Stream Power:	<u>0.386</u> lb/ft/sec/ft of stream width	Stream Power:	<u>0.410</u> lb/ft/sec/ft of stream width

Shear stress is greater than critical for both existing and proposed channel.
 Proposed shear / power is approximately equal to reference reach. Rock vanes
 will be used to ensure grade control.

Summary



CHANNEL PLAN VIEW SITE 5

SCALE

5
0
10

PLAN VIEW

PLANTING PLAN FOR
STABILIZATION MEASURES

ACTUAL NUMBER OF ROOTWADS AT EACH LOCATION TO BE DETERMINED BY THE ENGINEER.

PREPARE BENDS, TURNING UP AND AROUND BOTTOM FOOT LONG, ROOT WAD LOGS, AND ANCHOR LOGS, PICK ROCK AND LOGS IN BETWEEN ALL WADS TO PRACTICALLY SECURE ALL CONNECTIONS AND GAPS.

ROUTED TO BE PLACED THRU BENDS.

ROUTED TO OVERLAP.

NATIVE STONE PLACED BETWEEN ROOTWADS.

The diagram illustrates a cross-section of a channel. The top horizontal line is labeled "BANKFULL DEPTH" with a value of "10ft". A vertical line extends downwards from this point. The left side of the channel is labeled "SOIL PLAIN". The right side is labeled "POINT". The bottom of the channel is labeled "Floc". A horizontal dimension line at the base shows a distance of "2 ft". Above this, another dimension line indicates a height of "2.4 ft" from the floc line to the water surface. To the left of the channel, the text "TYPICAL SECTION BETWEEN" is written above "CHANNEL DETAIL". Below the channel, the text "PROPOSED TYPICAL SECTION" is written above "A BEND MEANDERED BY".

1. NUMBER OF ROOTWADS INSTALLED TO BE DETERMINED ON SITE. ROOTWADS TO BE SPACED 4X DIAMETER OF ROOT BASE.
2. STABILIZE BANKS AND FLOODPLAIN WITH WOODY VEGETATION AND GRASS.

TYPICAL FLOOD PLAIN

(Looking Downstream)

1 Metre Scale

Further
Fill Slope

4.7m

3.0m

1.0m

0.0m

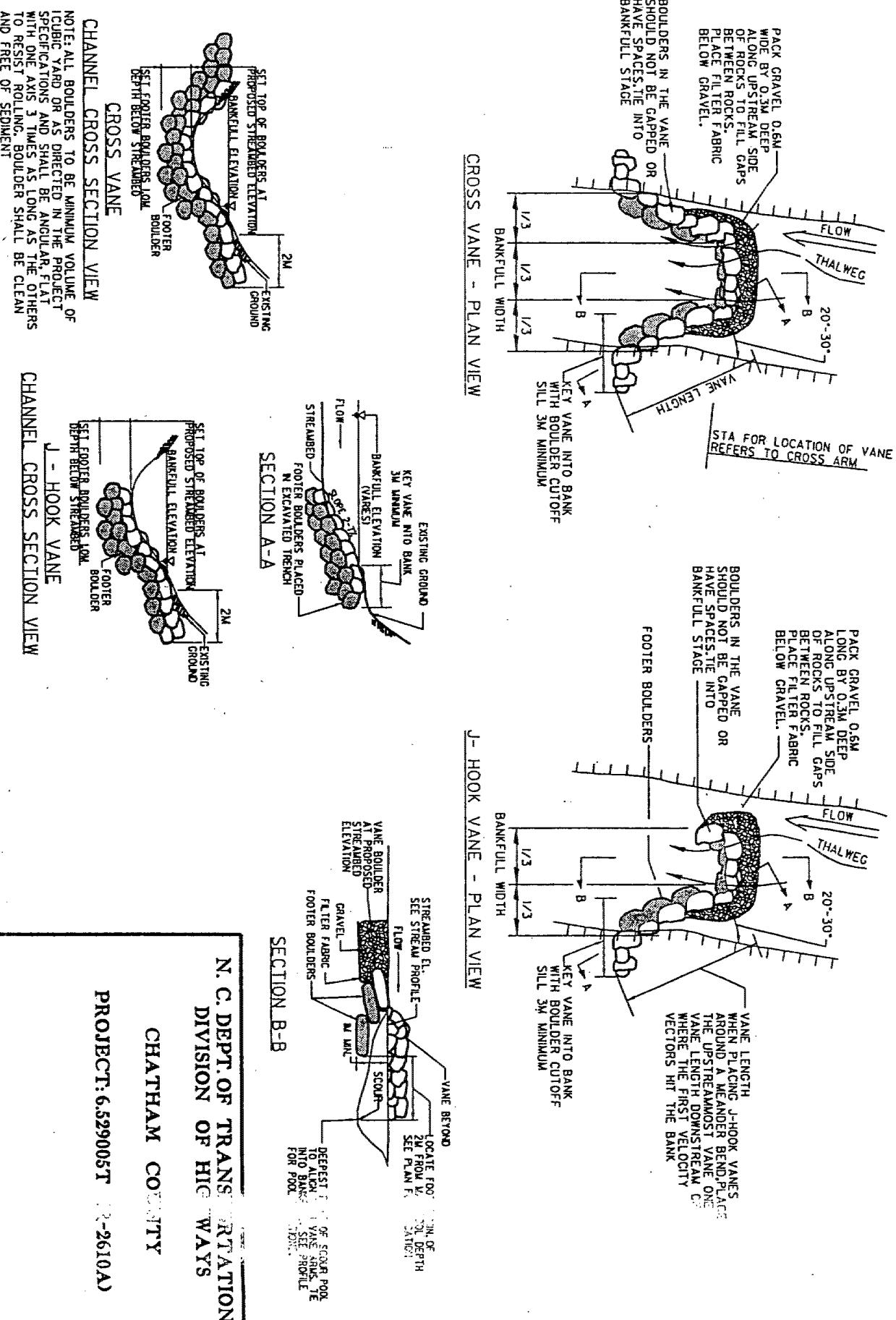
Flood Plain

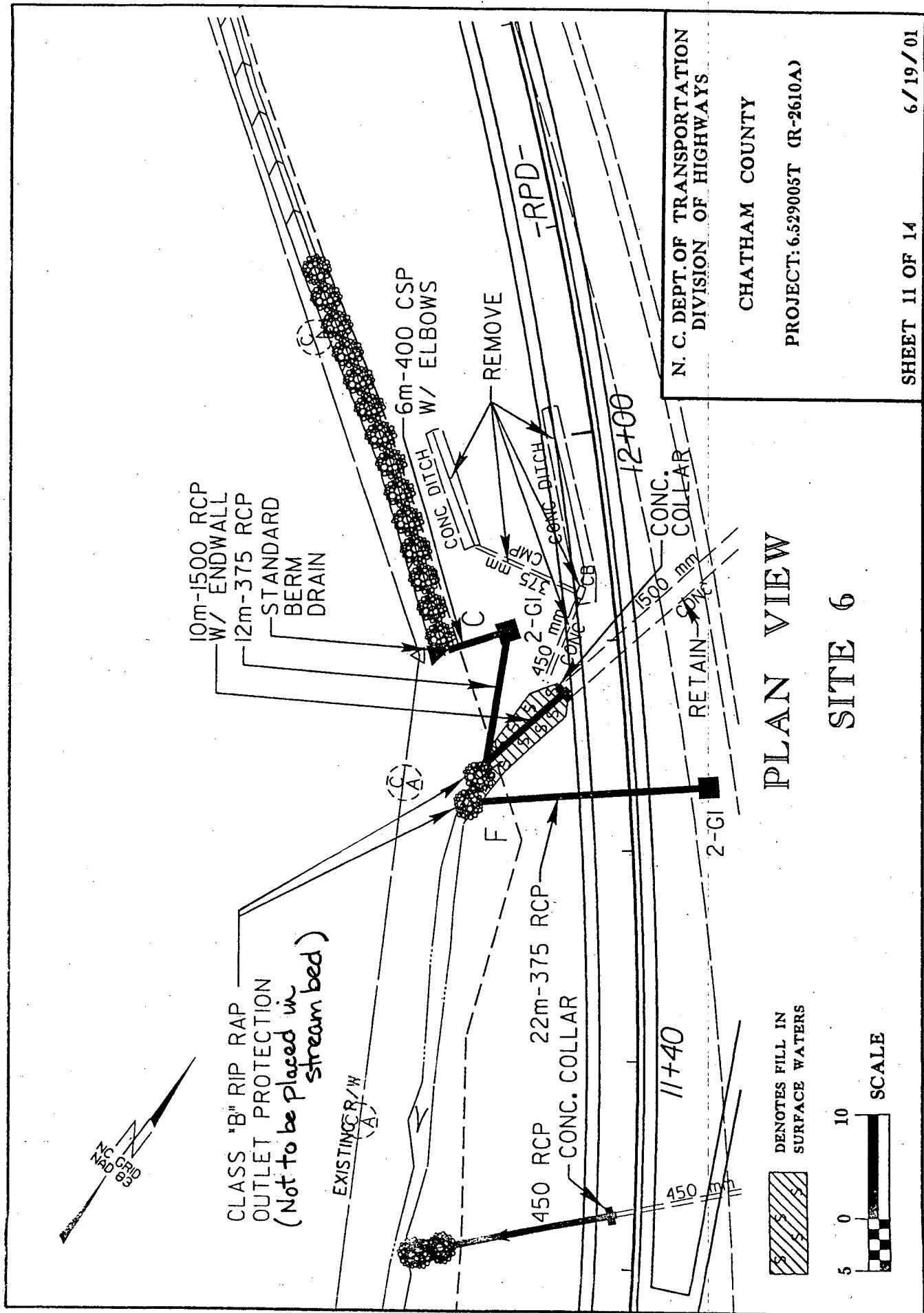
SEE CHANNEL DETAILS

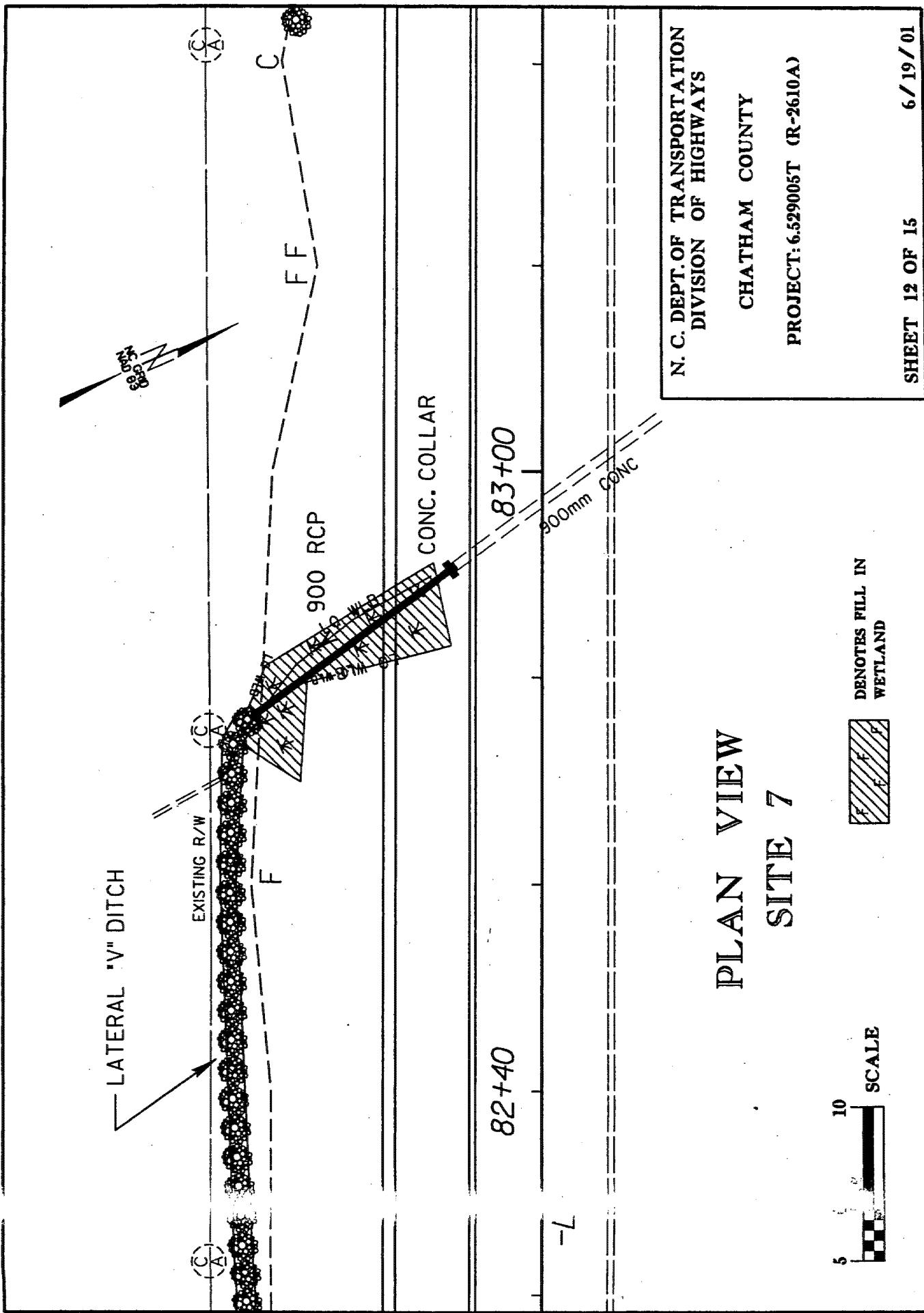
Natural Ground

N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROJECT: 6.529005T (R-2610A)







LATERAL
BASE DITCH
SEE DETAIL

EXISTING R/W

DITCH TURNOUT
EST. 10 MTNS

**CL. "B" RIP-RAP
EST. 24 SM FF**

83 + 40

—

1800

RE IAIN
CONC

3.0
CONC^{HW}
RETAIN

PLAN SITE 8

SCALE

1.8 CONC WW'S CONC HW RETAIN

D
W

DIVISION OF HIGHWAYS

CHATHAM COUNTY

PROJECT: 6.529005T (R-2610A)

SHEET 13 OF 15 2 / 05 / 03

WETLAND PERMIT IMPACT SUMMARY

WETLAND IMPACTS

Ellab-Gummerus

NCDOT

DIVISION OF HIGHWAYS
CHATHAM COUNTY —
PROJECT 6.529005T (R-26)
US 421 FROM APPROX 1.0
NORTH OF SR 1010 TO THE
LANE BYPASS SOUTH OF
SILER CITY

SHEET 43 OF 46 7/25/03

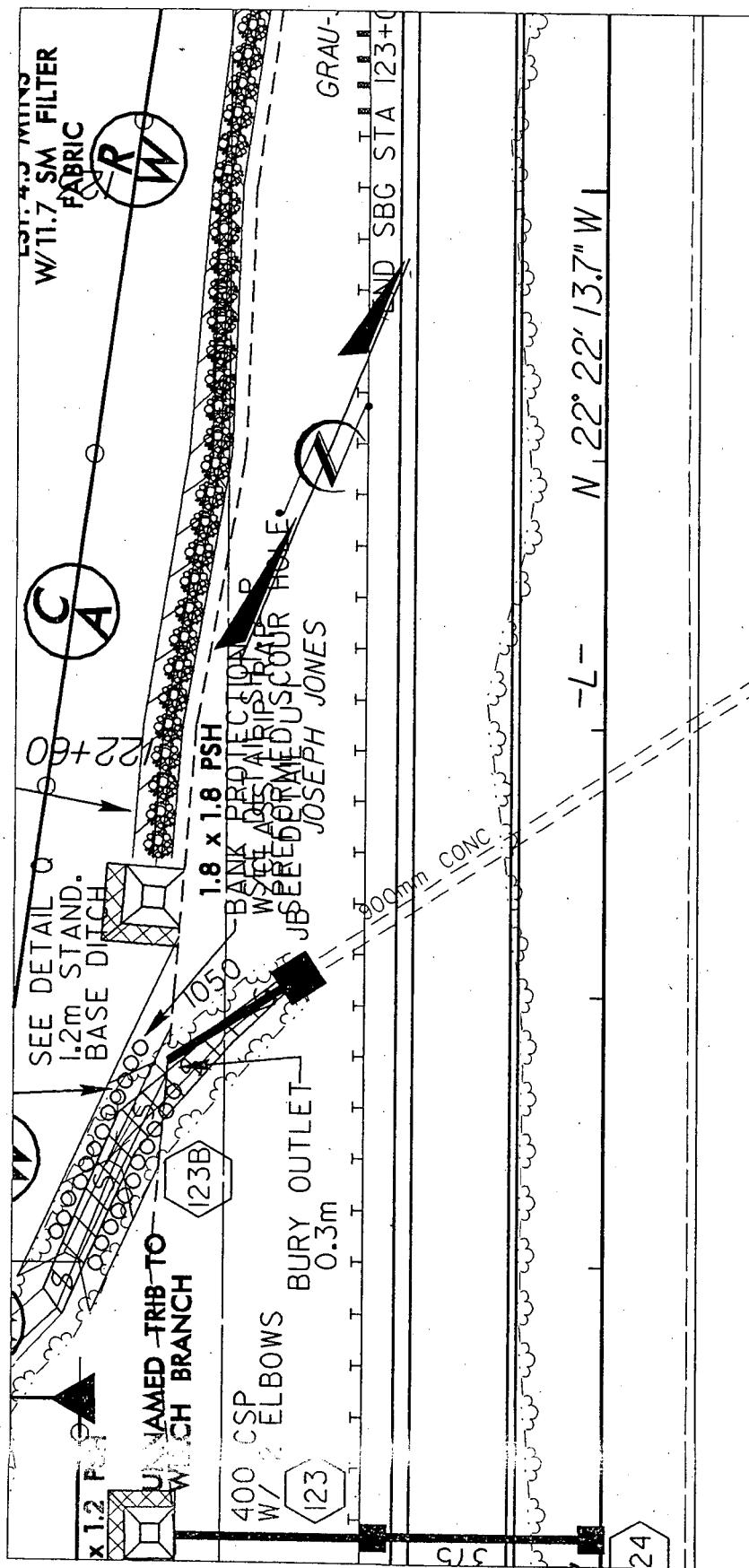
Revised 3/22/01

WETLAND PERMIT IMPACT SUMMARY							SURFACE WATER IMPACTS				
			WETLAND IMPACTS			SURFACE WATER IMPACTS					
Site No.	Station (From/To)	Structure Size / Type	Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation In Wetlands (ac)	Mechanized Clearing (Method III) (ac)	Fill In SW (Natural) (ac)	Fill In SW (Pond) (ac)	Temp. Fill In SW (ac)	Existing Channel Impacted (ft)	Natural Stream Design (ft)
1	11+80 - 12+40 -L-	750 rcp (30")					0.0160			144	
2	17+80 - 19+05 -L-	600 rcp (24")						0.0806		443	
3	22+52.3 - 23+14.5 -L-	Bridge							0.0024	20	
3A	37+57 - 37+90 -L-	750 rcp (30")	0.0634			0.0104					
4	56+50 -L-	1200 rcp (48")				0.0047				52	
5	69+80 -L-	1500 rcp (60")				0.0020				95	
6	76+52 - 76+80 -L-	750 rcp (30")				0.0145				121	
	76+40 - 76+80 -L-	750 rcp (30")	0.0624			0.0156					
7	79+40 -L-	1200 rcp (48")				0.0115				75	
8	81+05 - 81+15 -L-	1050 rcp(42")				0.0054				92	
9	93+90 - 94+88 -L-	1200 rcp (48")				0.0247				292	
10	96+81.4 - 97+18.6 -L-	Bridge						0.0211		62	

English Summary

NCDOT

DIVISION OF HIGHWAYS
 CHATHAM COUNTY
 PROJECT 6.529005T (R-2610B)
 US 421 FROM APPROX 1.0KM
 NORTH OF SR 1010 TO THE 4
 LANE BYPASS SOUTH OF
 SILER CITY
 SHEET 42 OF 46
 7/25/03

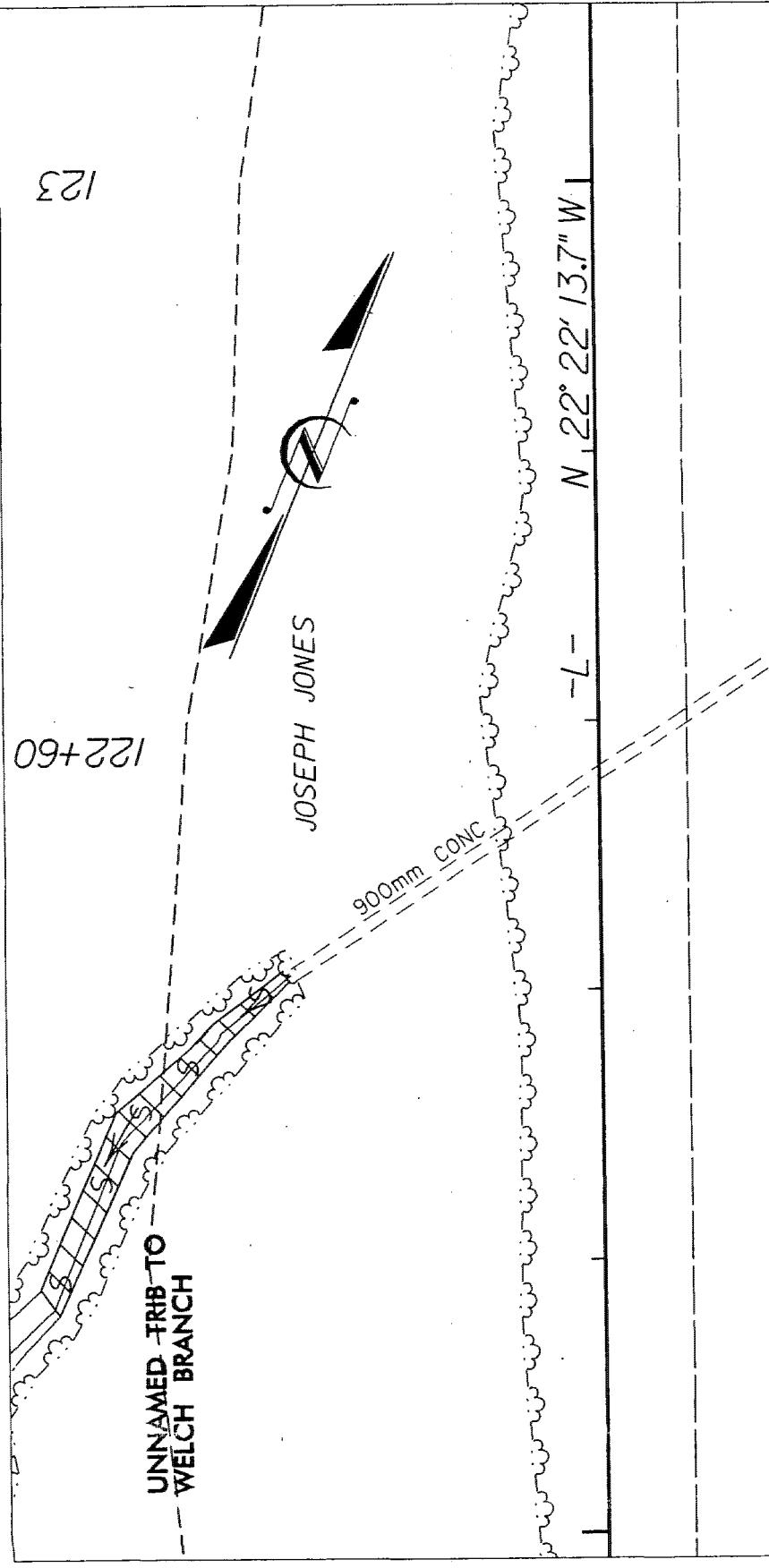


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DIVISION OF HIGHWAYS
CHATHAM COUNTY
PROJECT: 6.529005T (R-2610B)
US 401 FROM APPROX 1.0 KM
NORTH OF SR 1010 TO THE 4
LANE BYPASS SOUTH OF
SILER CITY
SHEET 4D OF 47 JULY 25, 2003

5 DENOTES FILL IN
SURFACE WATER

SITE 13
SCALE PLAN VIEW





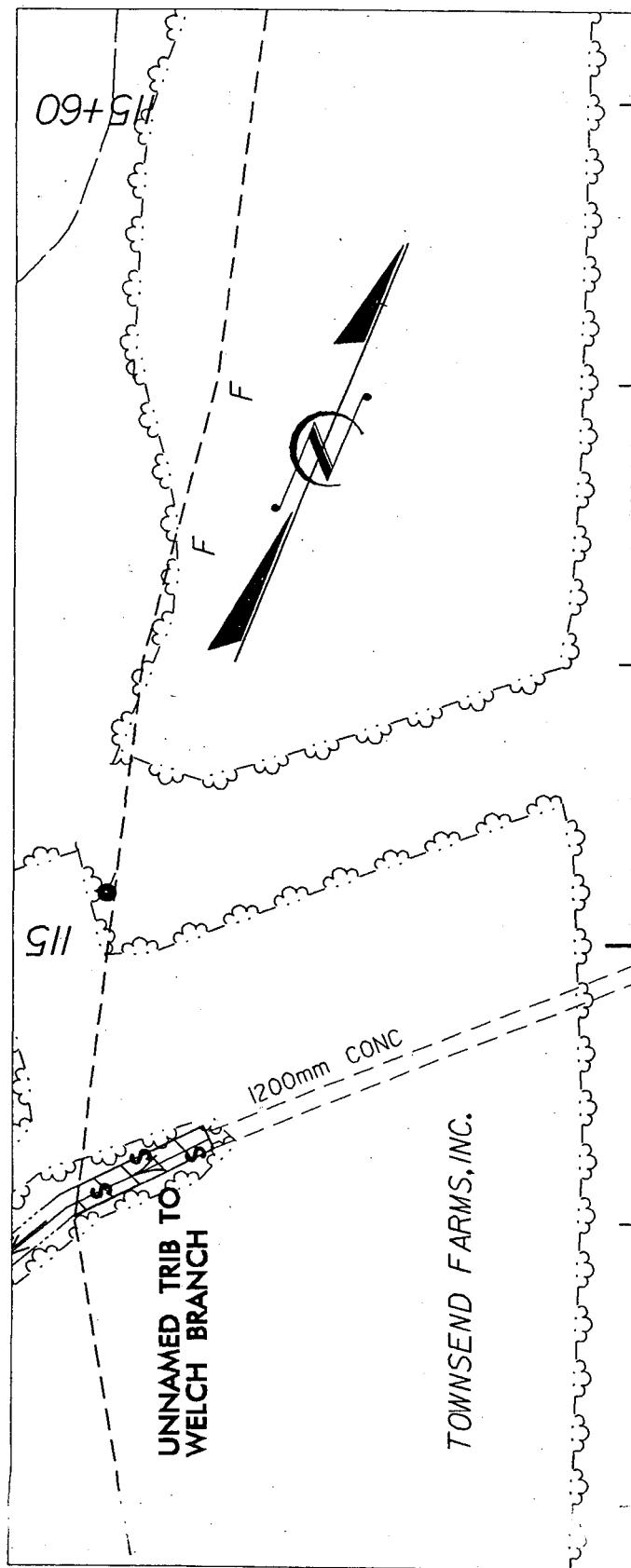
NCDOT
DIVISION OF HIGHWAYS
CHATHAM COUNTY
PROJECT: 6.529005T (R-2610B)
US 421 FROM APPROX 1.0 KM
NORTH OF SR 1010 TO THE 4
LANE BYPASS SOUTH OF
SILER CITY

JULY 25, 2003

SITE 13 IMPACTS
PLAN VIEW

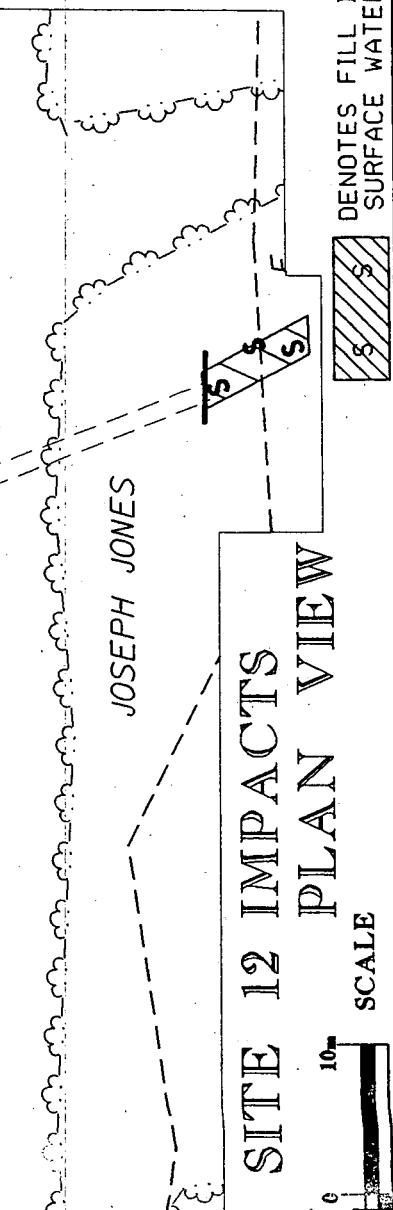
F

3.5
BK HW



US 421 8.4 BST US 421 8.4 BST

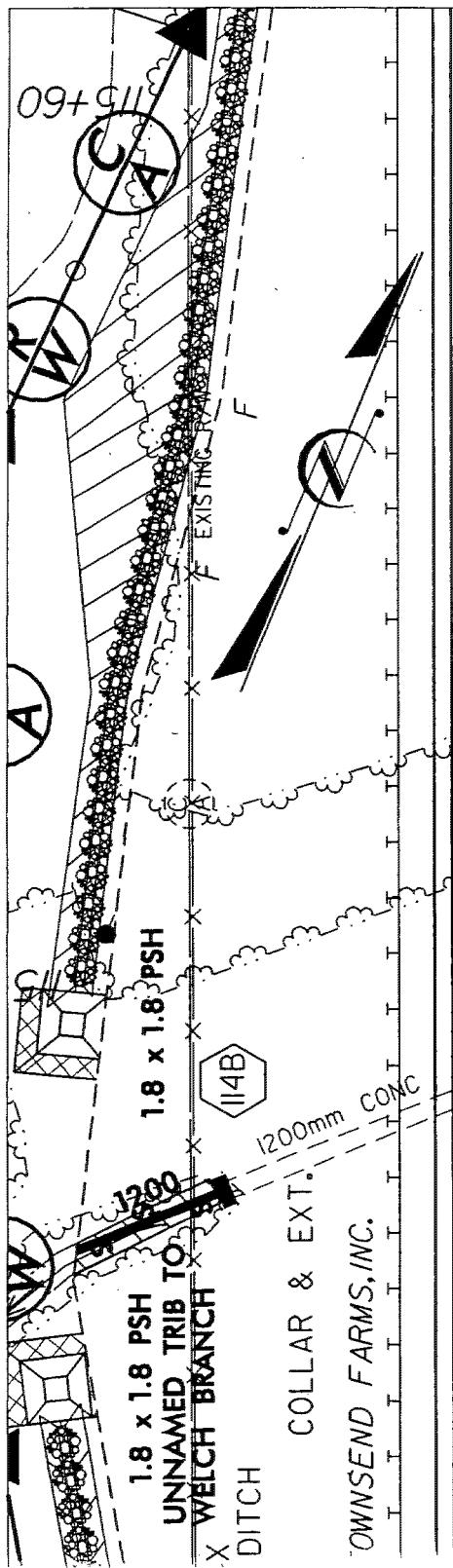
NCDOT
DIVISION OF HIGHWAYS
CHATHAM COUNTY
PROJECT: 6.529005T (R-2610B)
US 421 FROM APPROX 1.0 KM
NORTH OF SR 1010 TO THE 4
LANE BYPASS SOUTH OF
SILER CITY



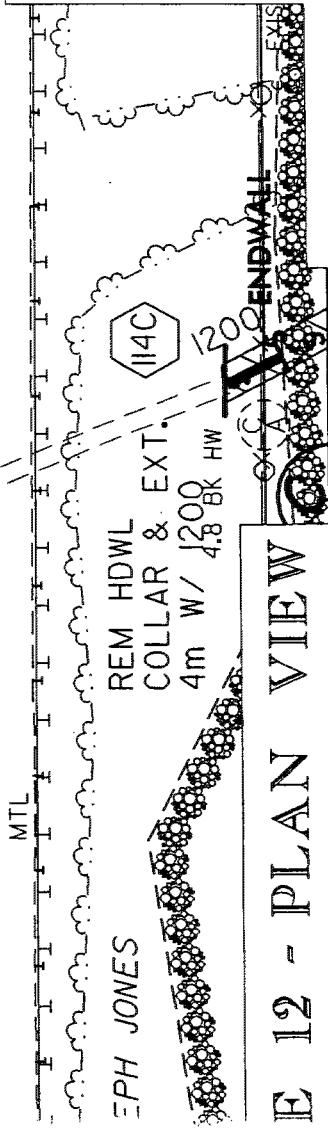
**SITE 12 IMPACTS
PLAN VIEW**



100' SURFACE WATER SHEET 12 OF 16 JULY 25, 2003



RETAIN \ US 42I 8.4 BST US 42I 8.4 BST



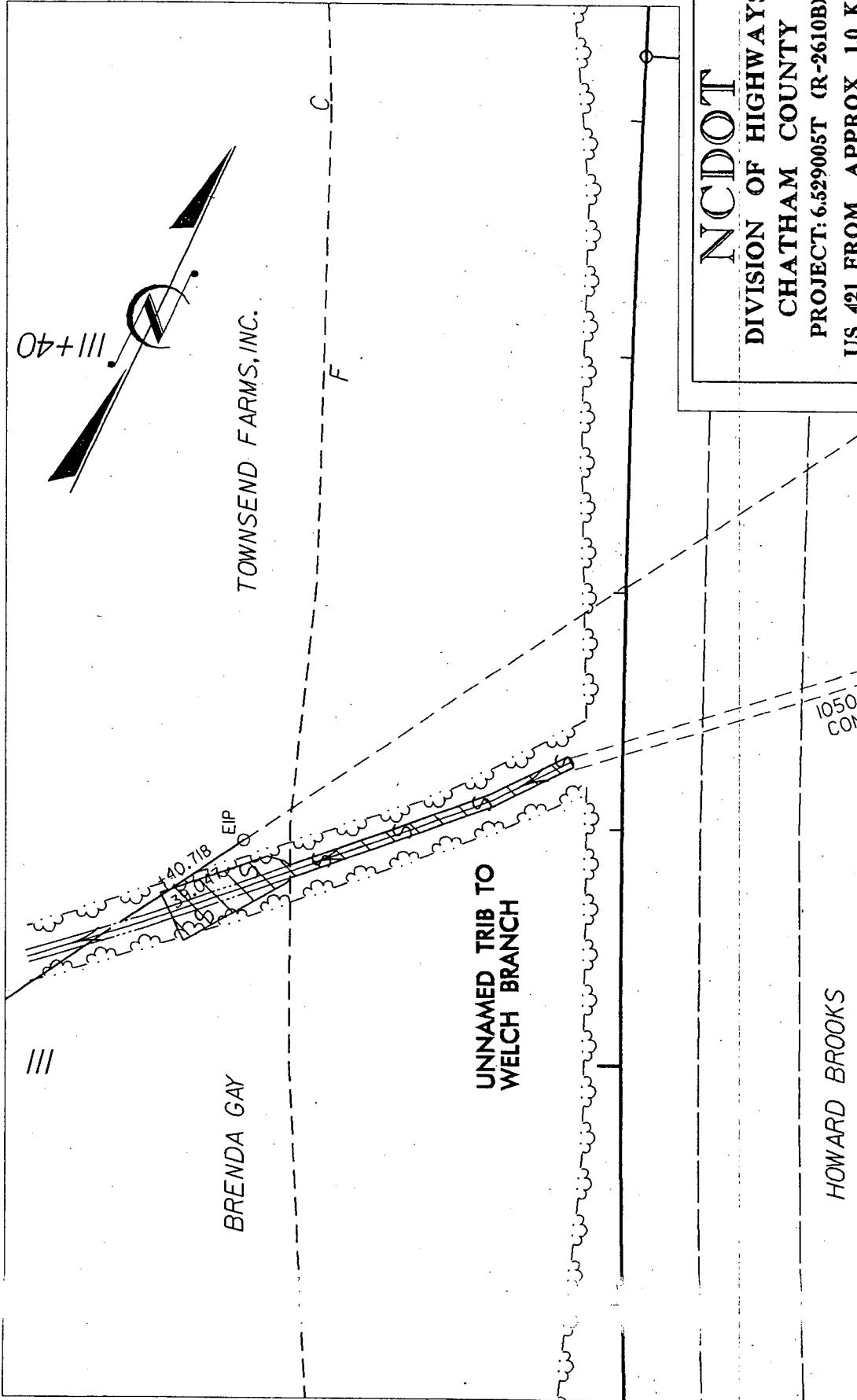
E 12 - PLAN VIEW



SCALE 1:500 DENOTES FILL IN SURFACE WATER

NC DOT
DIVISION OF HIGHWAYS
CHATHAM COUNTY
PROJECT: 6.529005T (R-2610B)
US 42I FROM APPROX 1.0 KM
NORTH OF SR 1010 TO THE 4
LANE BYPASS SOUTH OF
SILER CITY

SHEET 32 OF 42 JULY 25, 2003



NCDOT

DIVISION OF HIGHWAYS

CHATHAM COUNTY

PROJECT: 6529005T (R-2610B)

US 421 FROM APPROX 1.0 KM
NORTH OF SR 1010 TO THE 4
LANE BYPASS SOUTH OF
SILER CITY

SHEET 37 OF 37 JULY 25, 2003

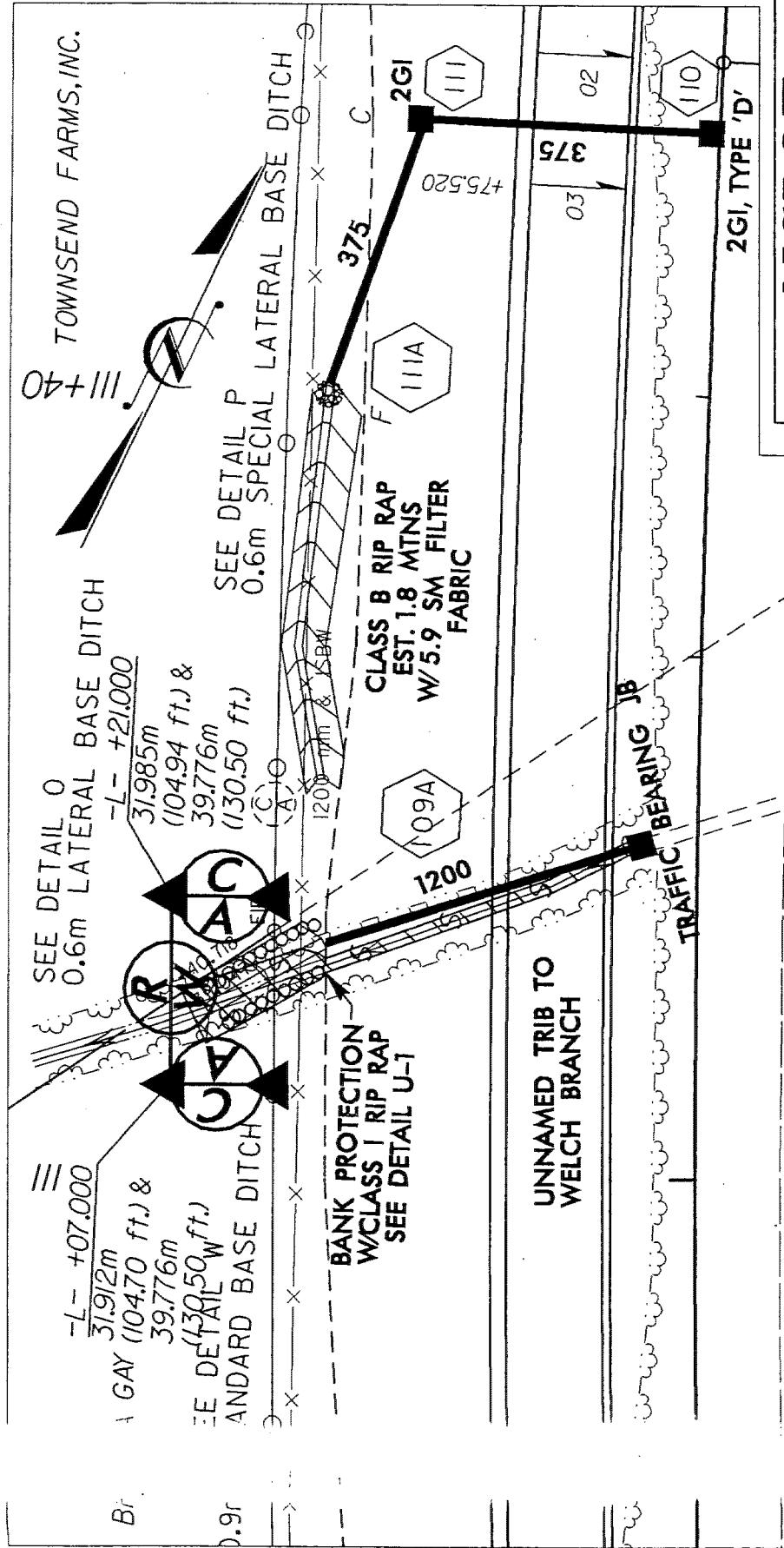
SITE 11 IMPACTS PLAN VIEW



SCALE

DENOTES FILL IN
SURFACE WATER





NCDOT
 DIVISION OF HIGHWAYS
 CHATHAM COUNTY
 PROJECT: 6529005T (R-2610B)
 US 421 FROM APPROX 1.0 KM
 NORTH OF SR 1010 TO THE 4
 LANE BYPASS SOUTH OF
 SILVER CITY

SITE 11
PLAN VIEW

10m

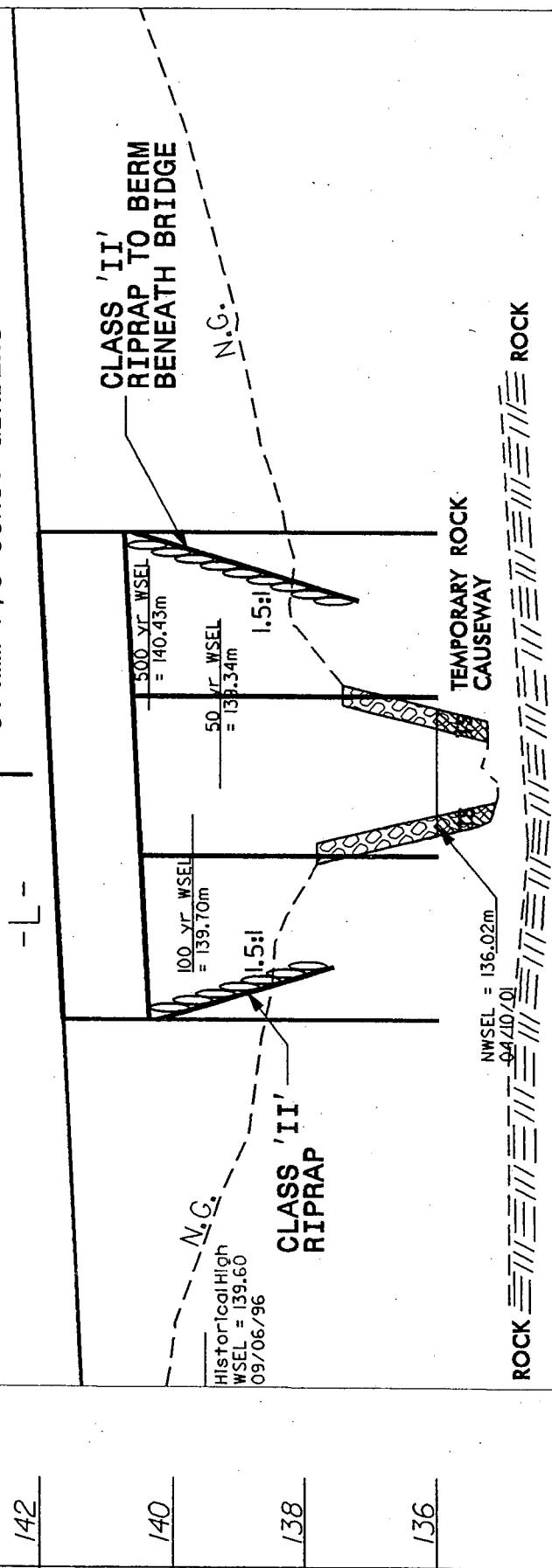
5m

SCALE 6 OF 6 SURFACE WATER SHEET 6 OF 6 JULY 25, 2003

144

STA. 97+00.00 -L-, 10.6m Lt. TO CENTER OF
TRAVELWAY
GRADE PT EL 141.920m
SKEW = 115°
Q 1@12.5m 1@12.2m, 1@12.5m
914mm P/S CONC. GIRDERS

142



SITE 10 PROFILE

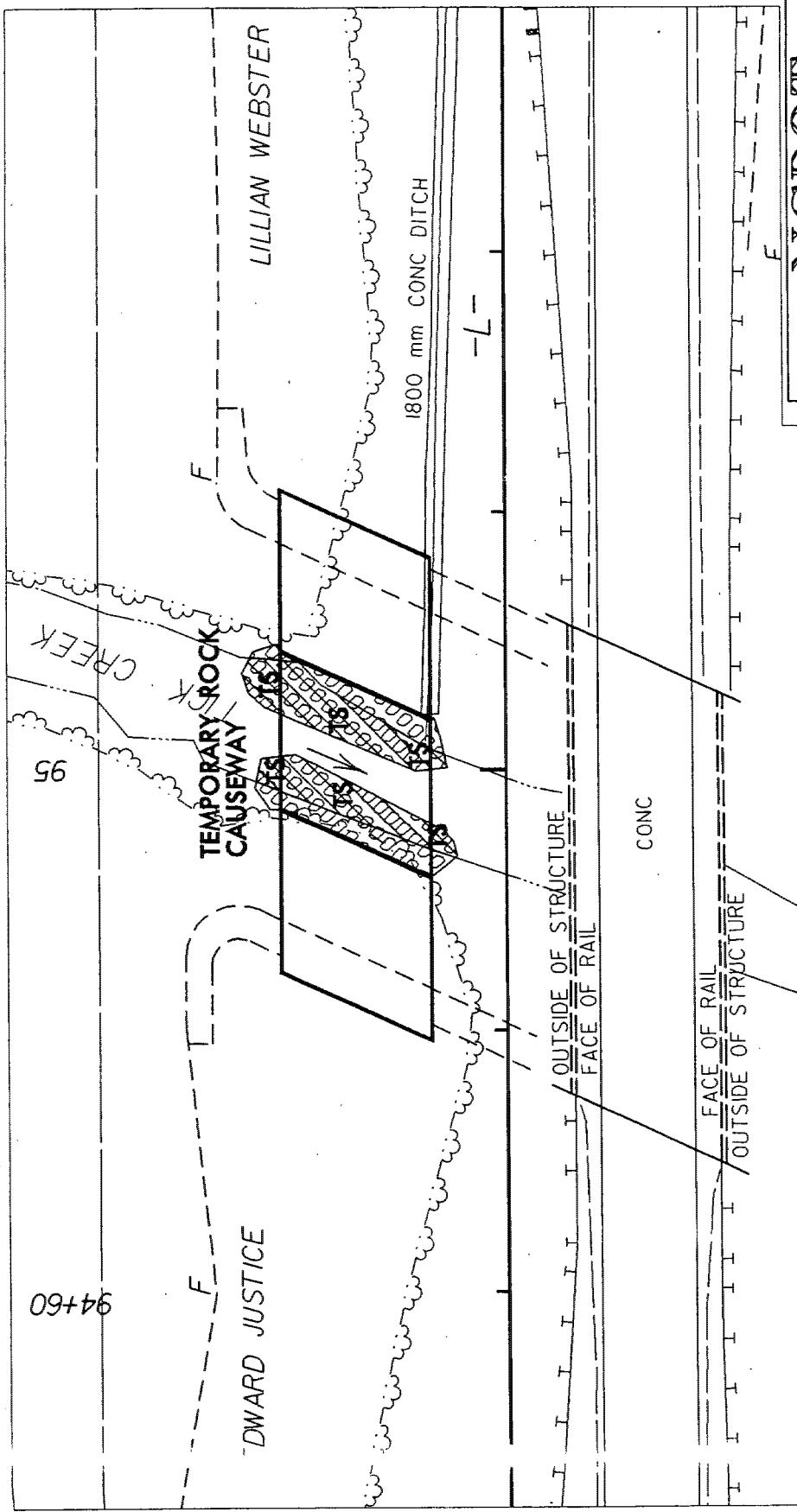
DENOTES TEMPORARY
FILL IN SURFACE
WATER

NC DOT

DIVISION OF HIGHWAYS
CHATHAM COUNTY
PROJECT: 6529005T (R-2610B)

US 421 FROM APPROX 1.0 KM
NORTH OF SR 1010 TO THE 4
LANE BYPASS SOUTH OF
SILER CITY

35 OF JULY 25, 2003



NC DOT
 DIVISION OF HIGHWAYS
 CHATHAM COUNTY
 PROJECT: 6529005T (R-2610B)
 US 421 FROM APPROX 1.0 KM
 NORTH OF SR 1010 TO THE 4
 LANE BYPASS SOUTH OF
 SILVER CITY

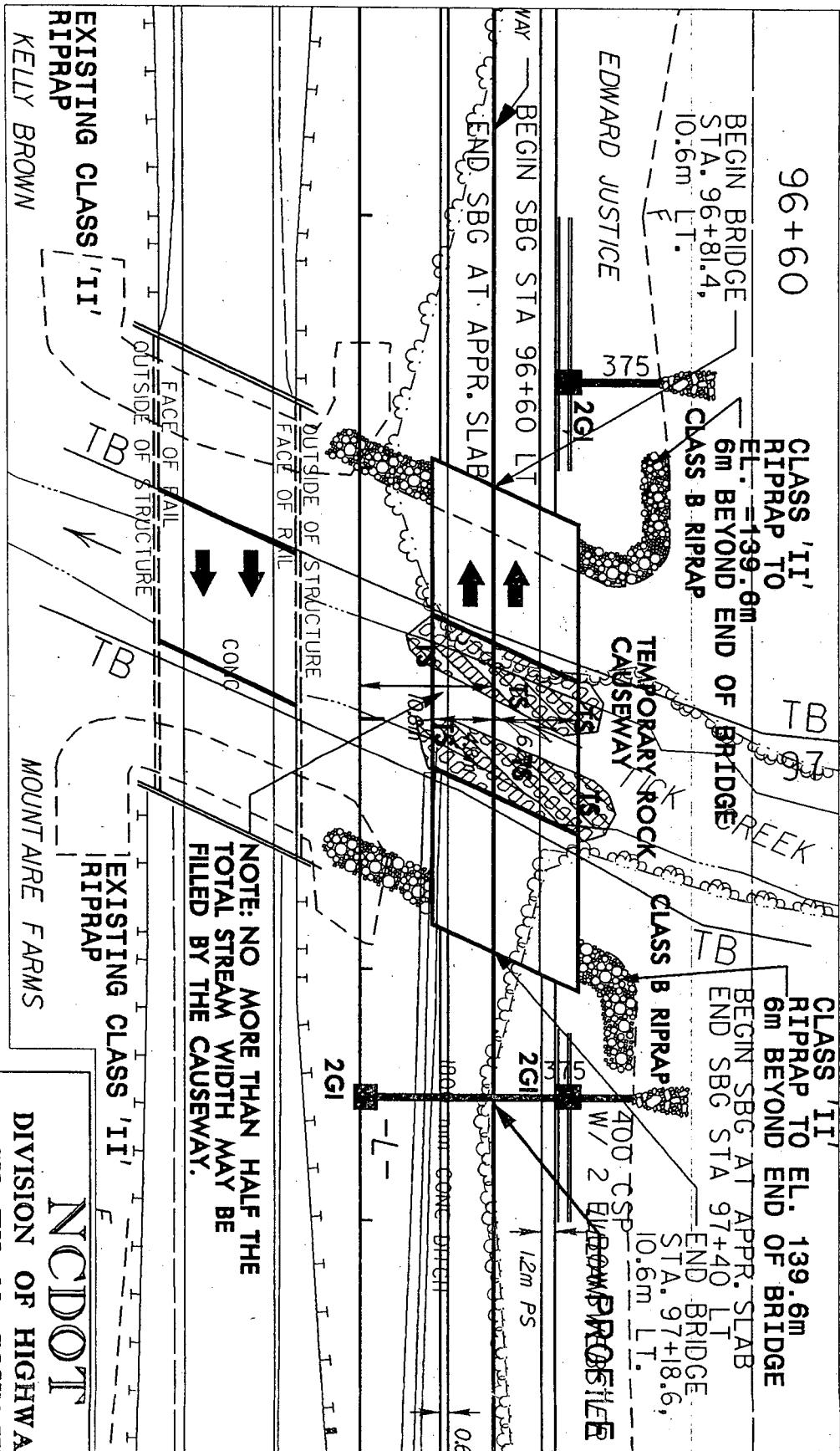
MOUNTAIRE FARMS

SITE 10 IMPACTS PLAN VIEW

KELLY BROWN

0 10m SCALE

4 OF 7 SHEET JULY 25, 2003



SITE 10 PLAN VIEW

SHEET 3 OF 4 JULY 25, 2003

5m
10m

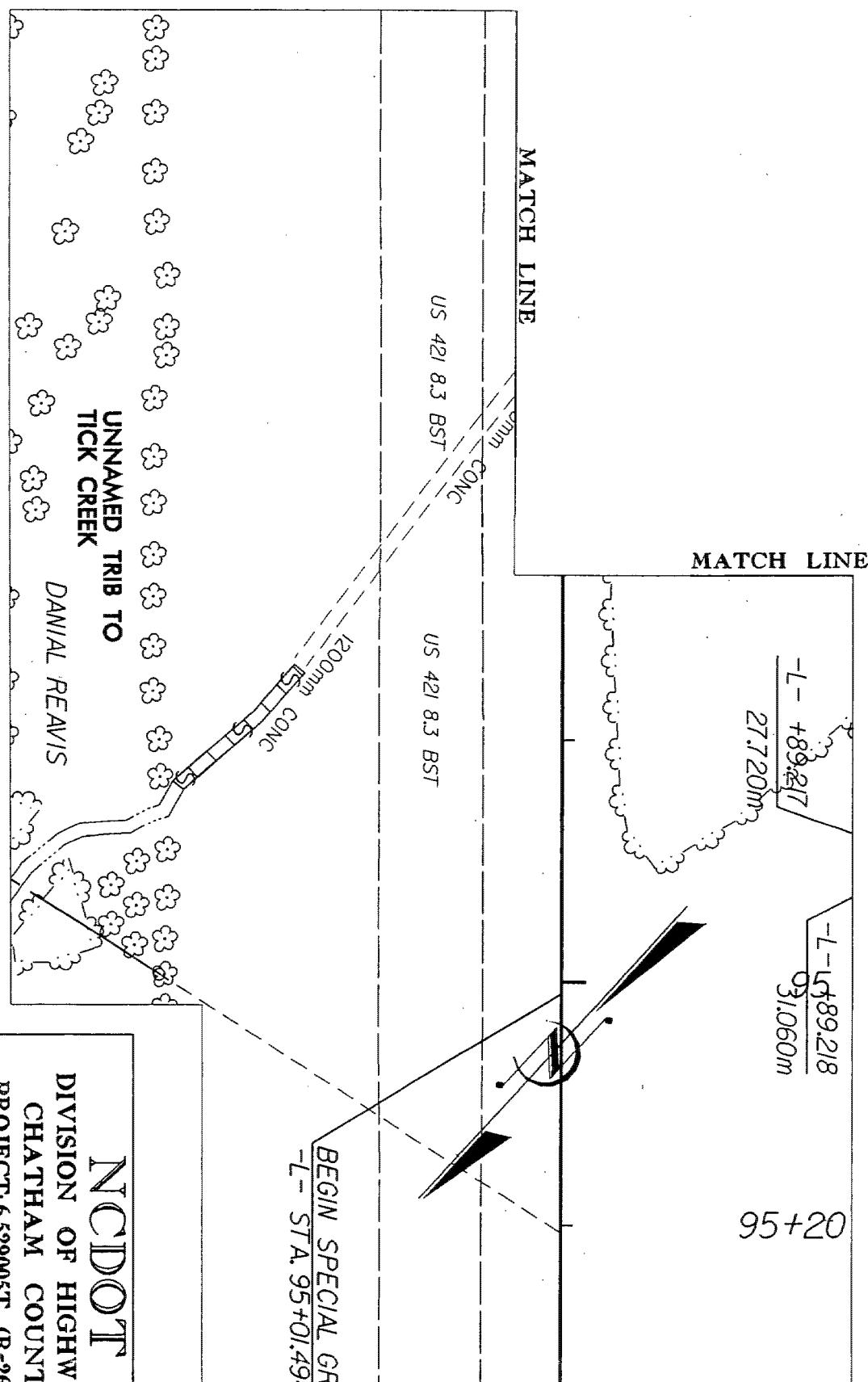
SCALE

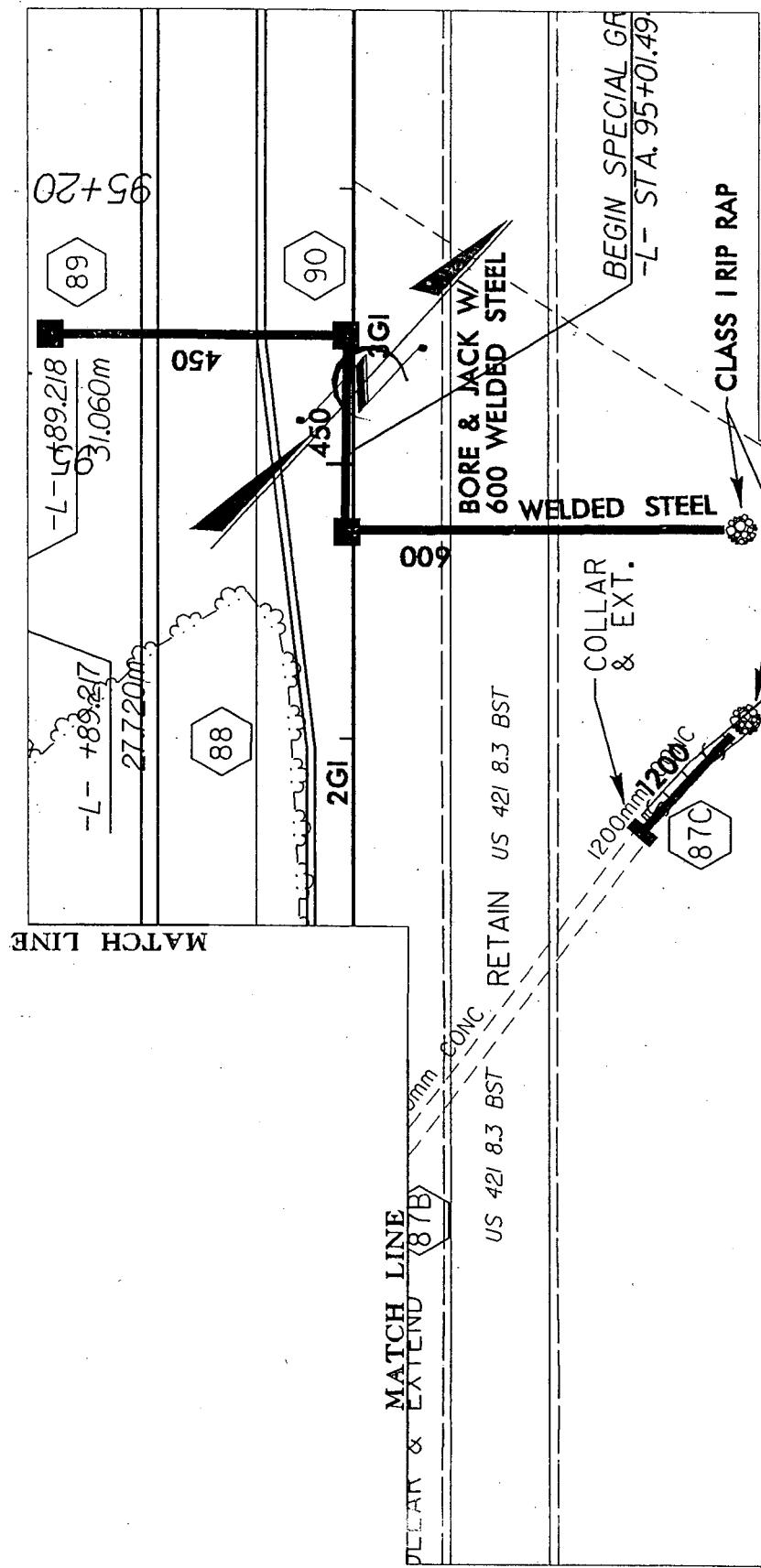
SITE 9 IMPACTS PLAN VIEW

DENOTES FILL IN
SURFACE WATER

US 421 FROM APPROX 1.0 KM
NORTH OF SR 1010 TO TEE 4
LANE BYPASS SOUTH OF
SILER CITY

SHEET 12 OF 12 JULY 26, 2003





NC DOT

DIVISION OF HIGHWAYS

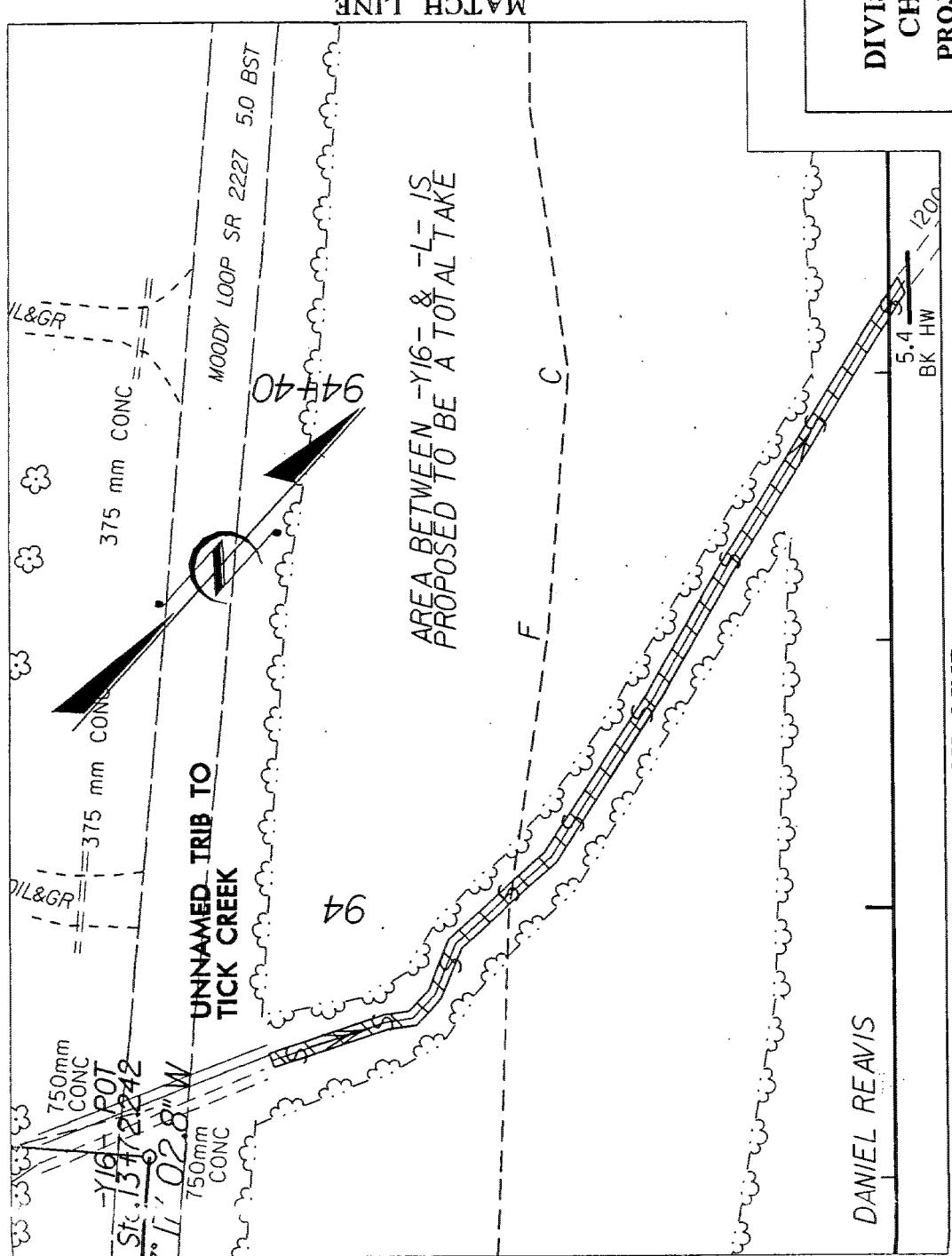
CHATHAM COUNTY

PROJECT: 6529005T (R-2610B)

US 421 FROM APPROX 1.0 KM
NORTH OF SR 1010 TO THE 4
LANE BYPASS SOUTH OF
SILER CITY

SHEET 1 OF 4 JULY 25, 2003

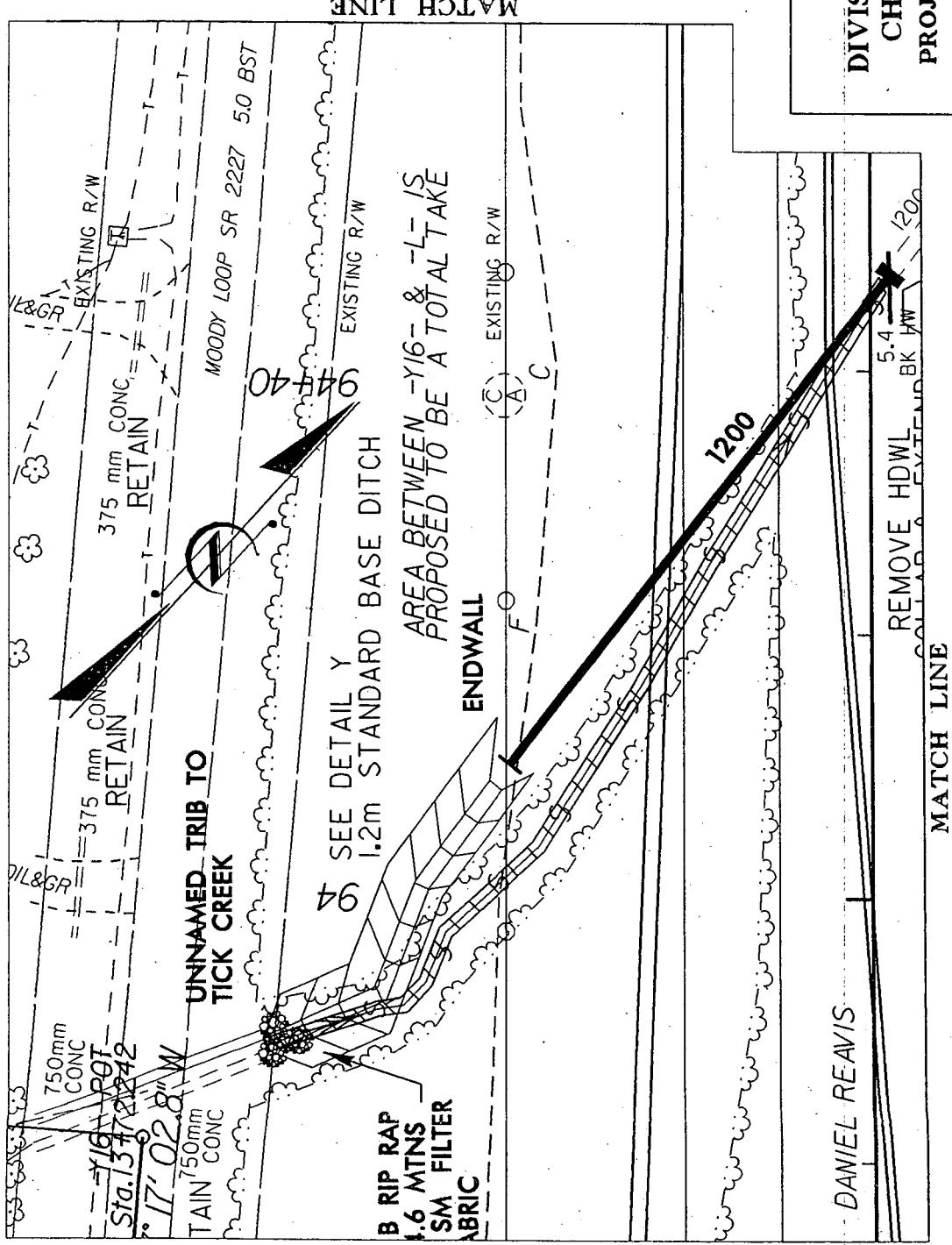
SITE 9
PLAN VIEW

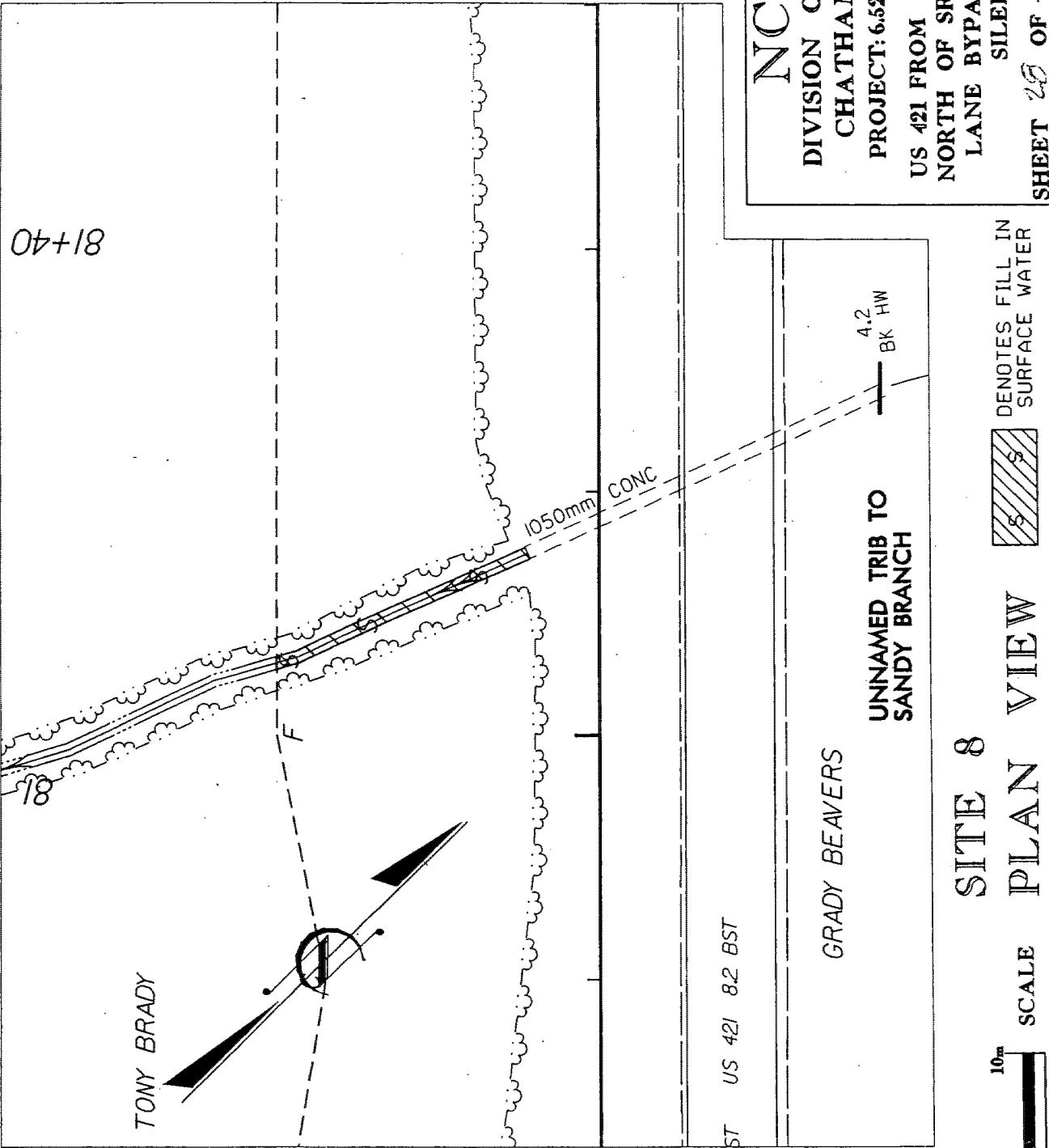


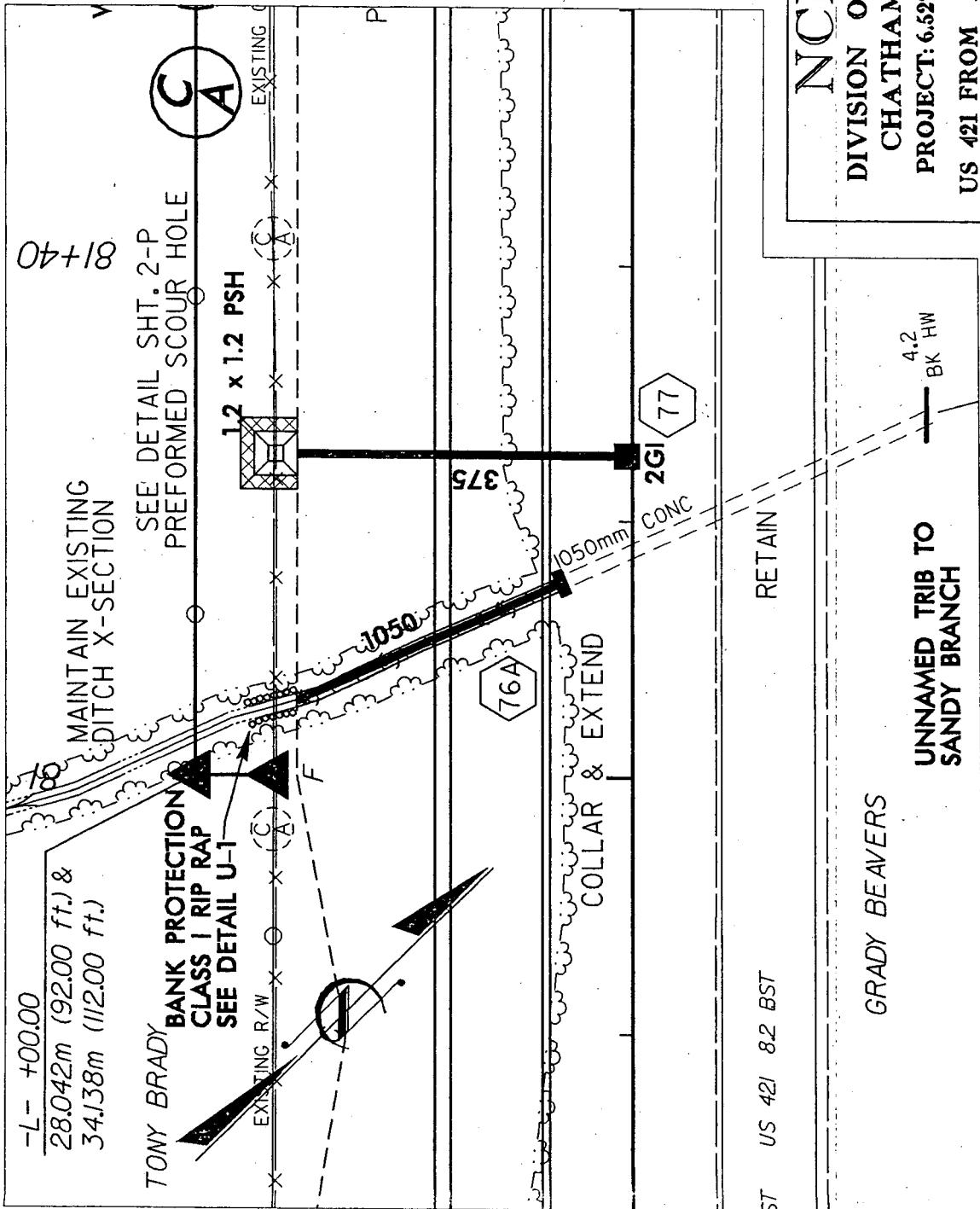
SHEET 30 OF 34 JULY 25, 2003

S DENOTES FILL IN
 SURFACE WATER

5m 0 10m

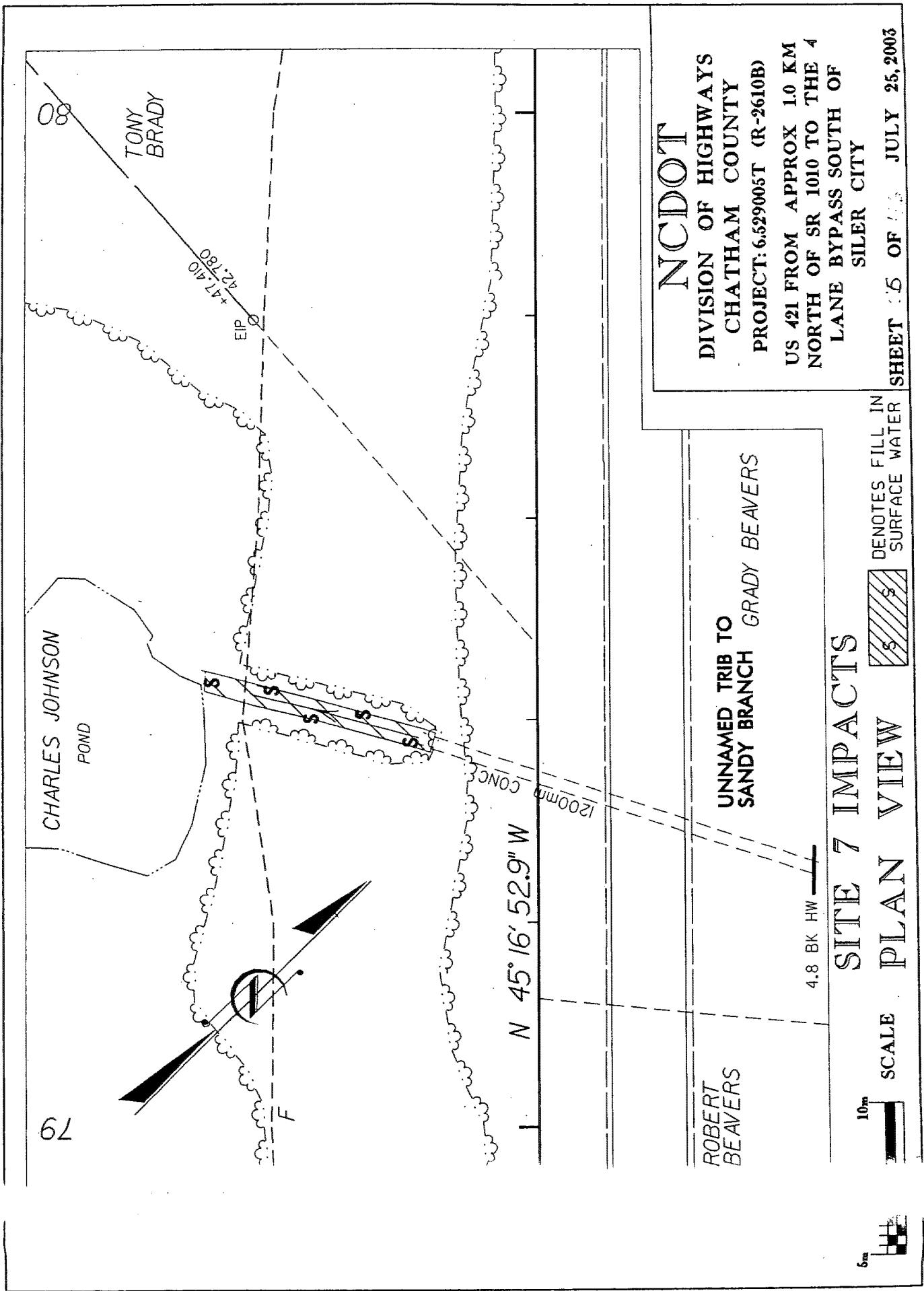


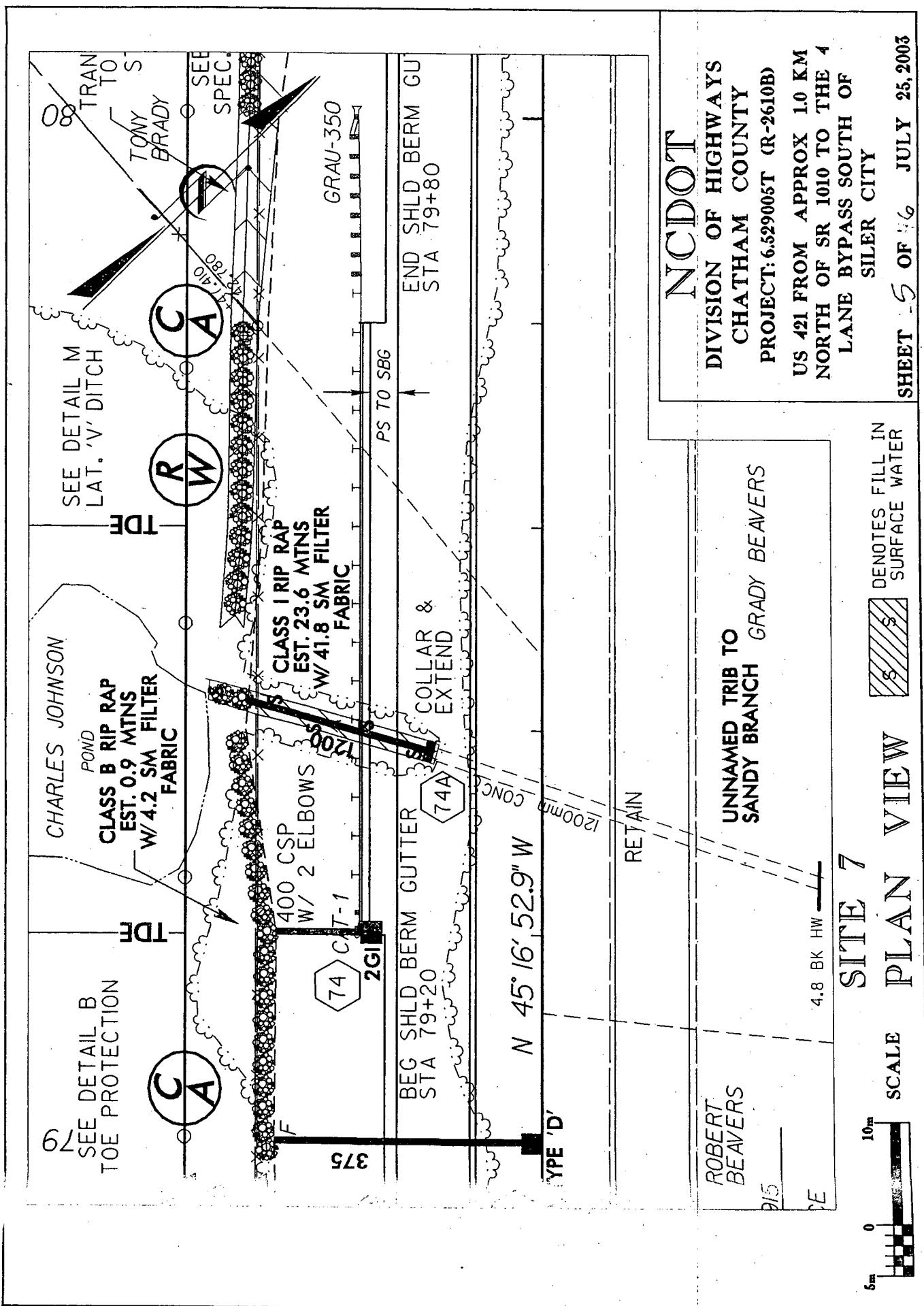




NCDOT
 DIVISION OF HIGHWAYS
 CHATHAM COUNTY
 PROJECT: 6.529005T (R-2610B)
 US 421 FROM APPROX 1.0 KM
 NORTH OF SR 1010 TO THE 4
 LANE BYPASS SOUTH OF
 SILVER CITY

SHEET 27 OF 4 JULY 25, 2003



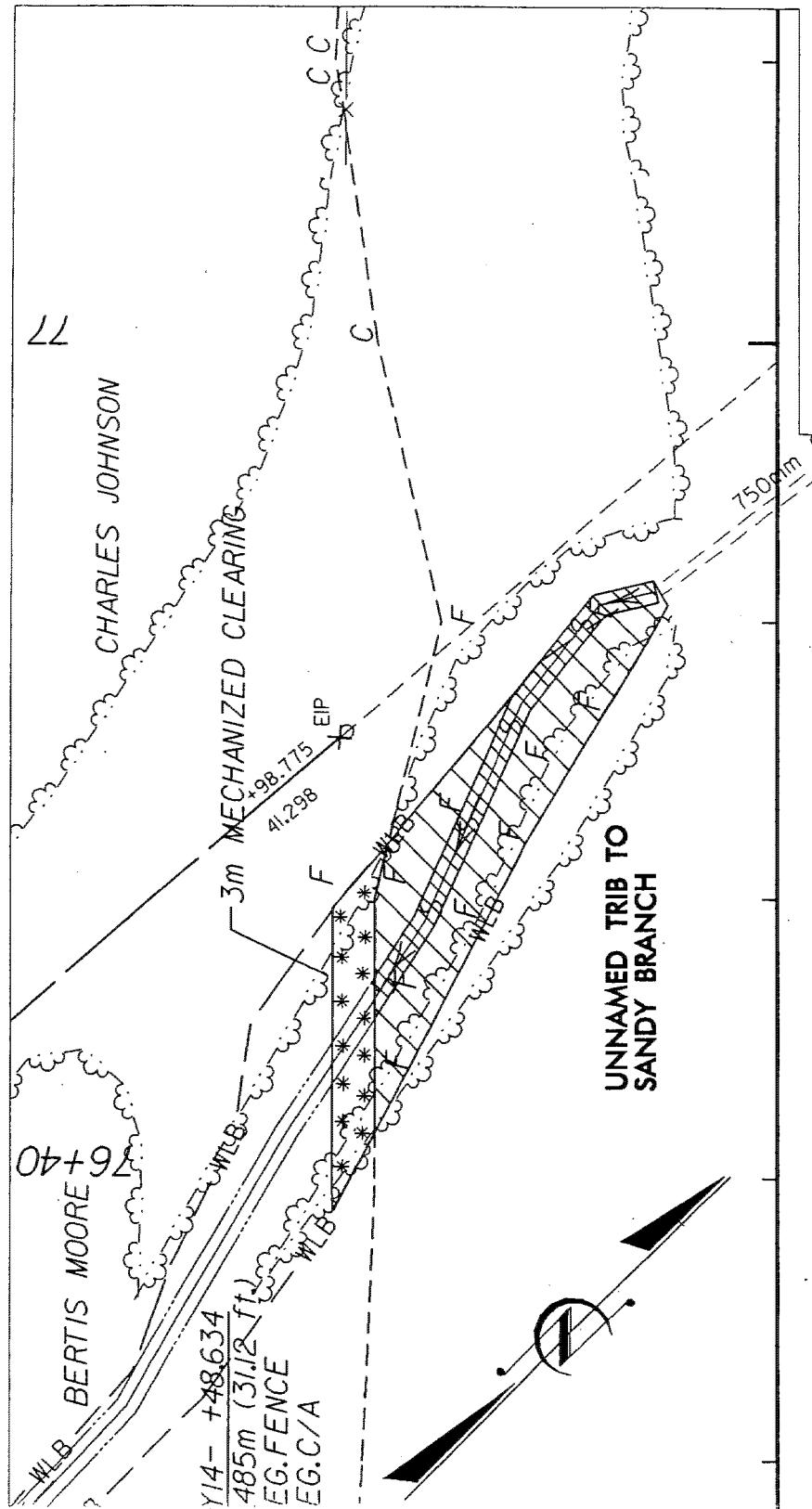


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DIVISION OF HIGHWAYS
CHATHAM COUNTY

PROJECT: 6.529005T (R-2610B)
US 421 FROM APPROX 1.0 KM
NORTH OF SR 1010 TO THE 4
LANE BYPASS SOUTH OF
SILER CITY

SHEET 4 OF 4 JULY 25, 2003



LEWIS MOORE

DENOTES MECHANIZED
CLEARING S DENOTES FILL IN
 SURFACE WATER F DENOTES FILL IN
 WETLAND

10m

5m

SITE 6 IMPACTS SCALE PLAN VIEW

MATCH LINE

04+69

2.7 BK HW
1.5 BK WW

1.5 BK WW

S

CURTIS MOORE

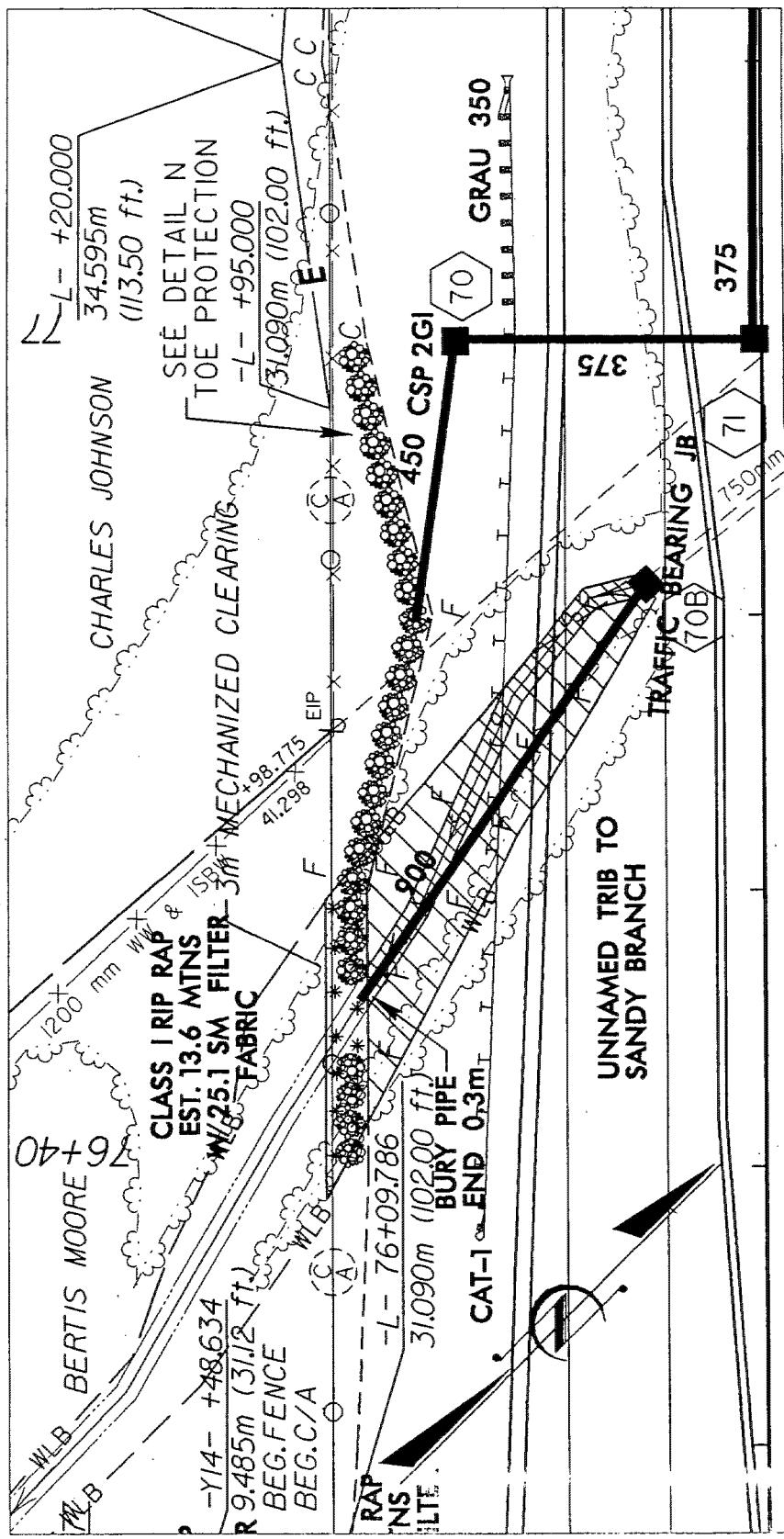
UNNAMED TRIB TO
SANDY BRANCH



SITE 5 IMPACTS
PLAN VIEW

DENOTES FILL IN
SURFACE WATER

NCDOT
DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 6529005T (R-2610B)
US 421 FROM APPROX 1.0 KM
NORTH OF SR 1010 TO THE 4
LANE BYPASS SOUTH OF
SILER CITY
SHEET 22 OF 6 JULY 25, 2003



NCDOT

DIVISION OF HIGHWAYS
RE-CHATHAM COUNTY

PROJECT: 6.529005T (R-2610B)
US 421 FROM APPROX 1.0 KM
NORTH OF SR 1010 TO THE 4
LANE BYPASS SOUTH OF
SILER CITY

SHEET 3 OF 4 JULY 25, 2003

RE
LEWIS MOORE

SPECIAL MEDIAN DITCH GRADE
SEE PROFILE SHT. 49

DENOTES MECHANIZED
CLEARING SITE 6

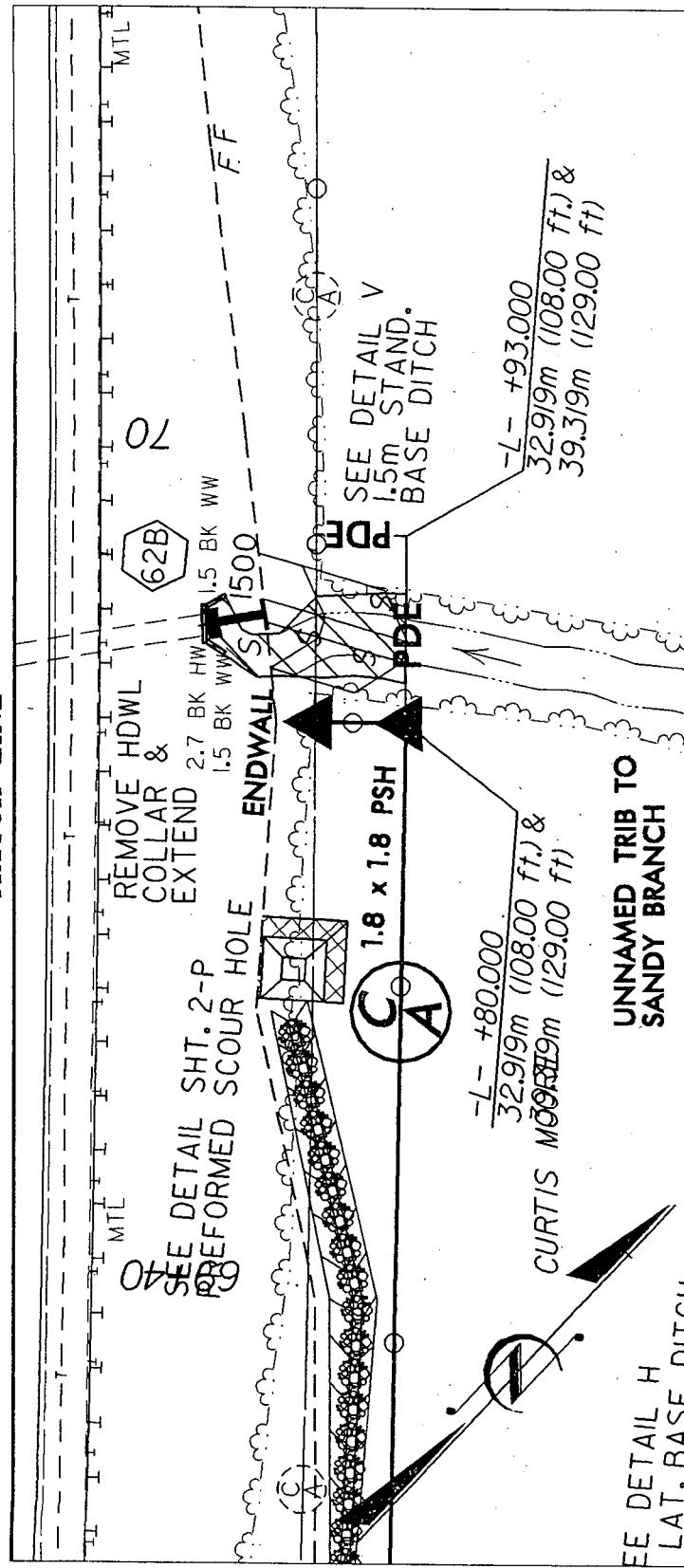


PLAN VIEW

SCALE



MATCH LINE



NCDOT

DIVISION OF HIGHWAYS

RANDOLPH COUNTY

PROJECT: 6529005T (R-2610B)

US 421 FROM APPROX 1.0 KM
NORTH OF SR 1010 TO THE 4
LANE BYPASS SOUTH OF

SILER CITY

SHEET 2/ OF 4 JULY 25, 2003

SITE 5
PLAN VIEW

10m
SCALE



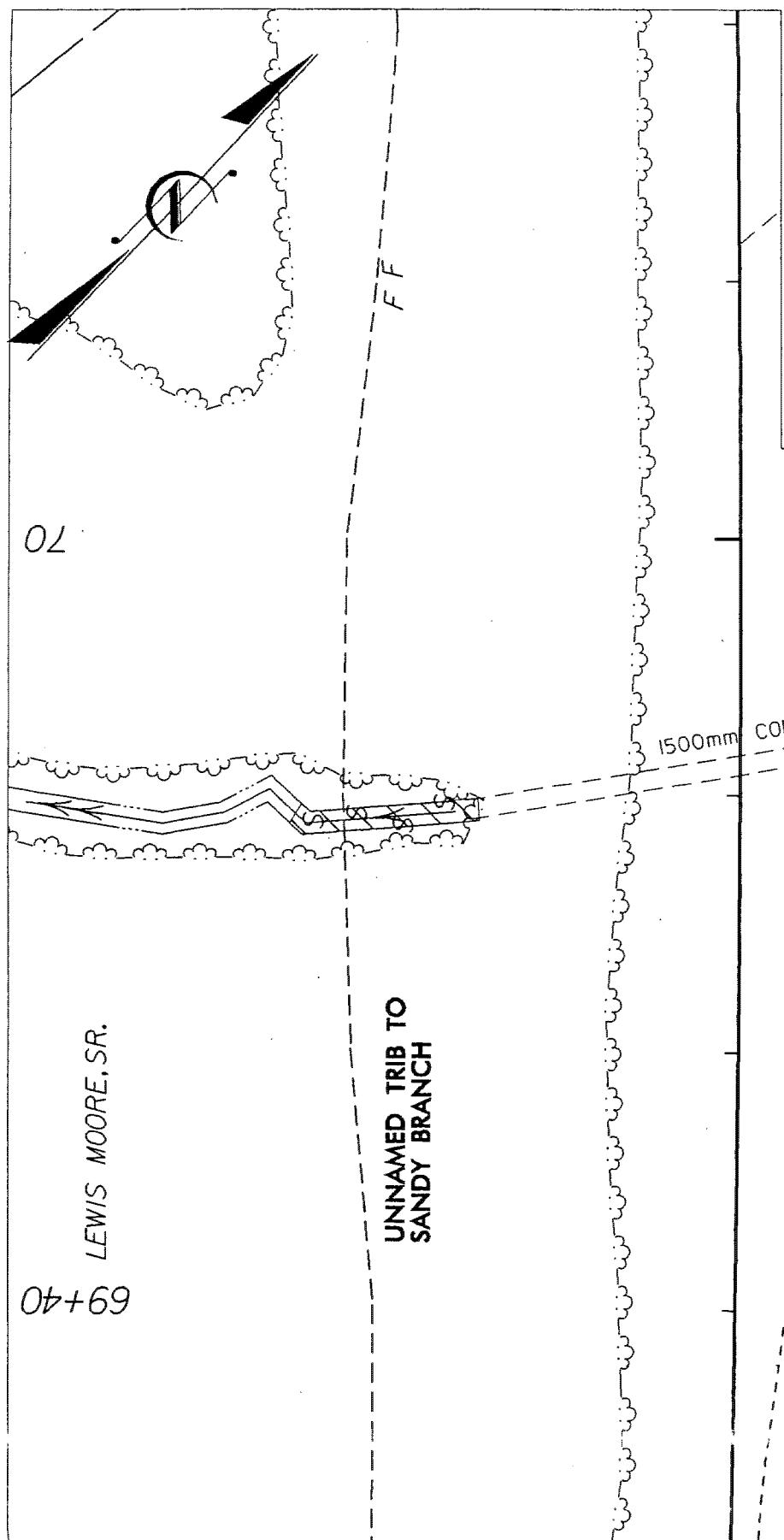
DENOTES FILL IN SURFACE WATER

LEWIS MOORE, SR.

69+40

02

UNNAMED TRB TO
SANDY BRANCH



1500mm CONC

NCDOT

DIVISION OF HIGHWAYS
RANDOLPH COUNTY

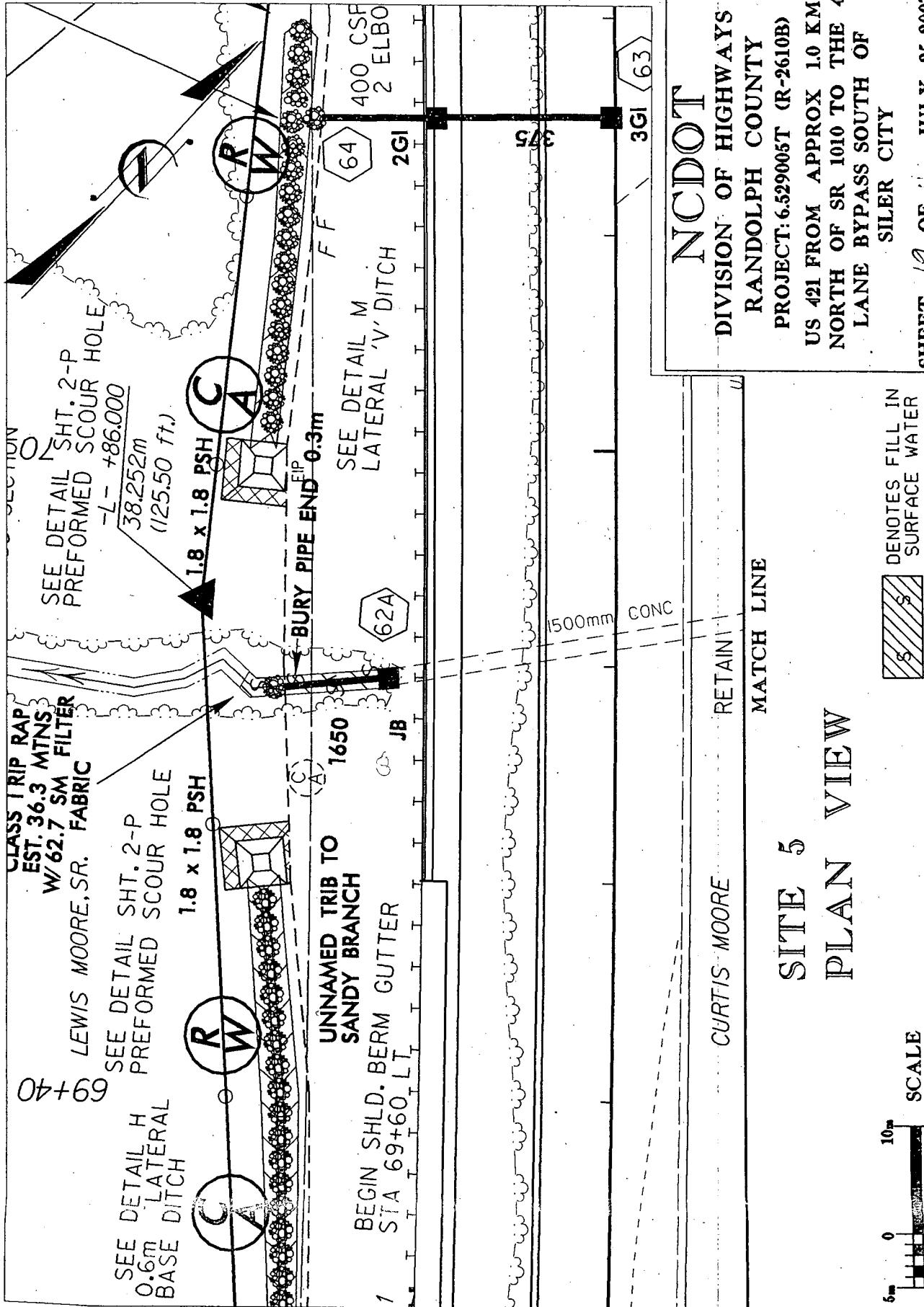
PROJECT: 6.529005T (R-2610B)
US 421 FROM APPROX 1.0 KM
NORTH OF SR 1010 TO THE 4
LANE BYPASS SOUTH OF
SILER CITY

SHEET 20 OF 20 JULY 25, 2003

CURTIS MOORE

MATCH LINE
SITE 5 IMPACTS
PLAN VIEW





UNNAMED TRIB TO
SANDY BRANCH

ROLAND FIELDS

F F

75

96

1200mm CONC

42/ 8.4 BST US 42/ 8.4 BST

MOORES MACHINE CO., INC.

SITE 4 IMPACTS
PLAN VIEW

10m SCALE



5 DENOTES FILL IN
SURFACE WATER

SHEET 10 OF 10 JULY 25, 2003

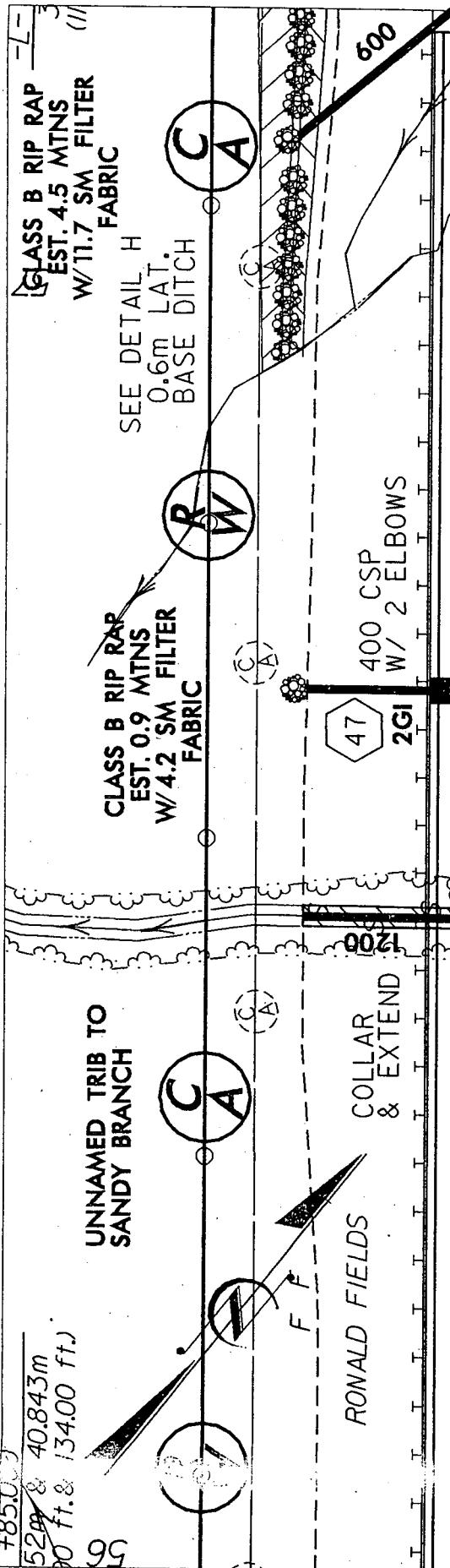
NCDOT

DIVISION OF HIGHWAYS
CHATHAM COUNTY

PROJECT: 6529006T (R-2610B)
US 421 FROM APPROX 1.0 KM
NORTH OF SR 1010 TO THE 4
LANE BYPASS SOUTH OF
SILER CITY

+85.0
52 ft.
40.843m
ft. &
134.00 ft.)
95

UNNAMED TRIB TO
SANDY BRANCH



US 421 8.4 BST US 421 8.4 BST

RETAIN

MOORES MACHINE CO., INC.

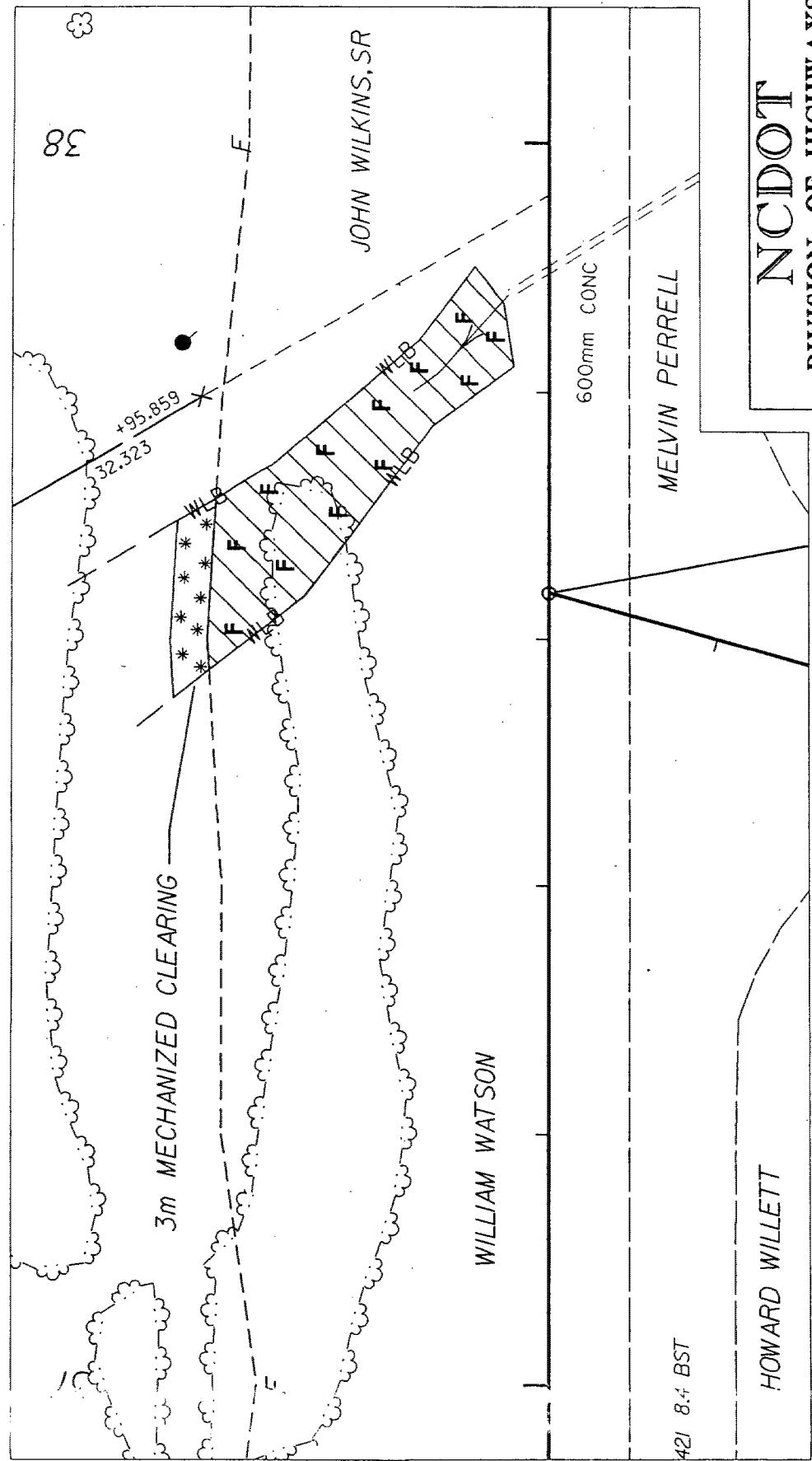
SITE 4 PLAN VIEW

0 10m SCALE

DENOTES FILL IN SURFACE WATER

NCDOT
DIVISION OF HIGHWAYS
CHATHAM COUNTY
PROJECT: 6.529005T (R-2610B)
US 421 FROM APPROX 1.0 KM
NORTH OF SR 1010 TO THE 4
LANE BYPASS SOUTH OF
SILER CITY

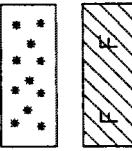
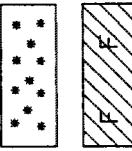
SHEET 17 OF 4 JULY 25, 2003

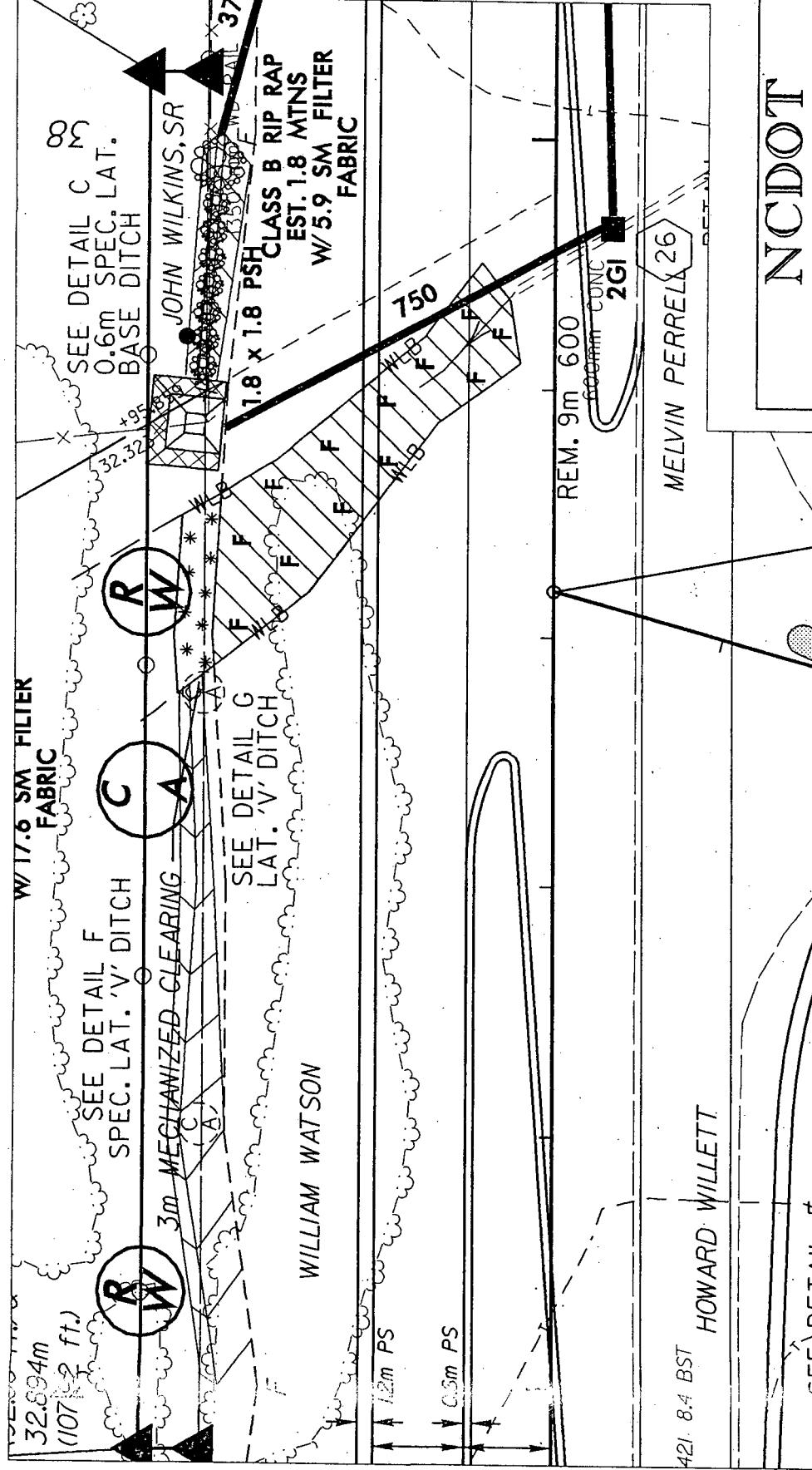


SITE 3A IMPACTS PLAN VIEW

NCDOT
DIVISION OF HIGHWAYS
CHATHAM COUNTY
PROJECT: 6.529005T (R-2610B)
US 421 FROM APPROX 1.0 KM
NORTH OF SR 1010 TO THE 4
LANE BYPASS SOUTH OF
SILER CITY

SHEET 6 OF 46 JULY 25, 2003





NC DOT

DIVISION OF HIGHWAYS

CHATHAM COUNTY

PROJECT: 6.529005T (R-2610B)

US 421 FROM APPROX 1.0 KM
NORTH OF SR 1010 TO THE 4
LANE BYPASS SOUTH OF
SILER CITY

SHEET 15 OF 15 JULY 25, 2003

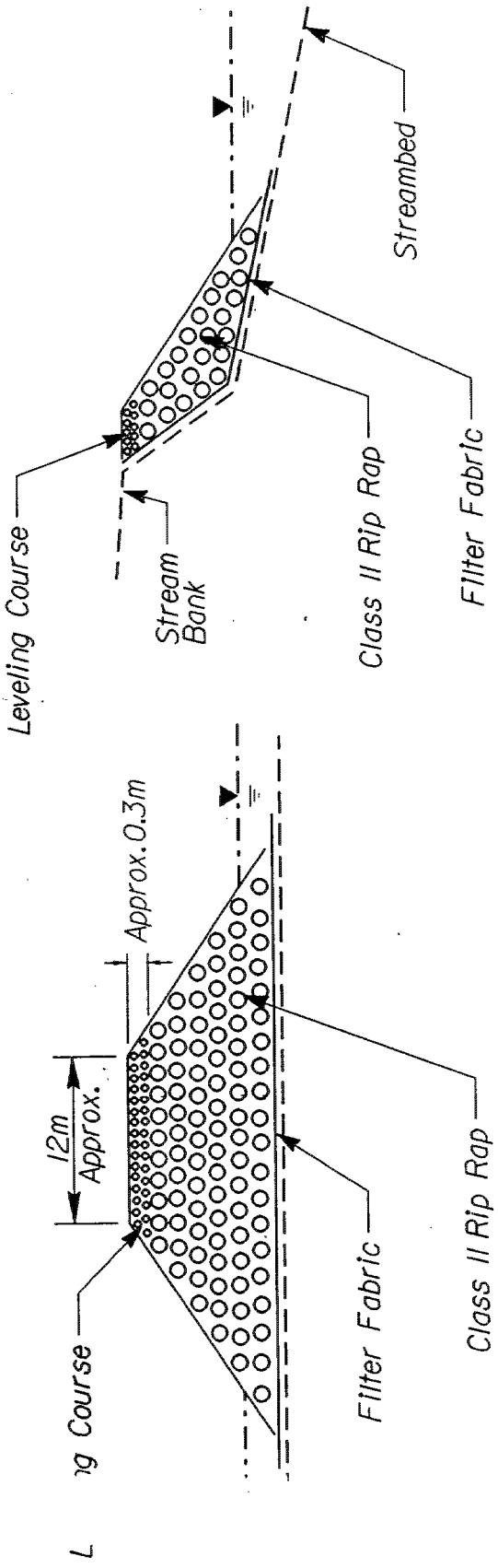
***** DENOTES MECHANIZED
CLEARING

FFFFF DENOTES FILL IN
WETLAND

SITE 3A
SCALE PLAN VIEW



END VIEW



CROSS SECTION

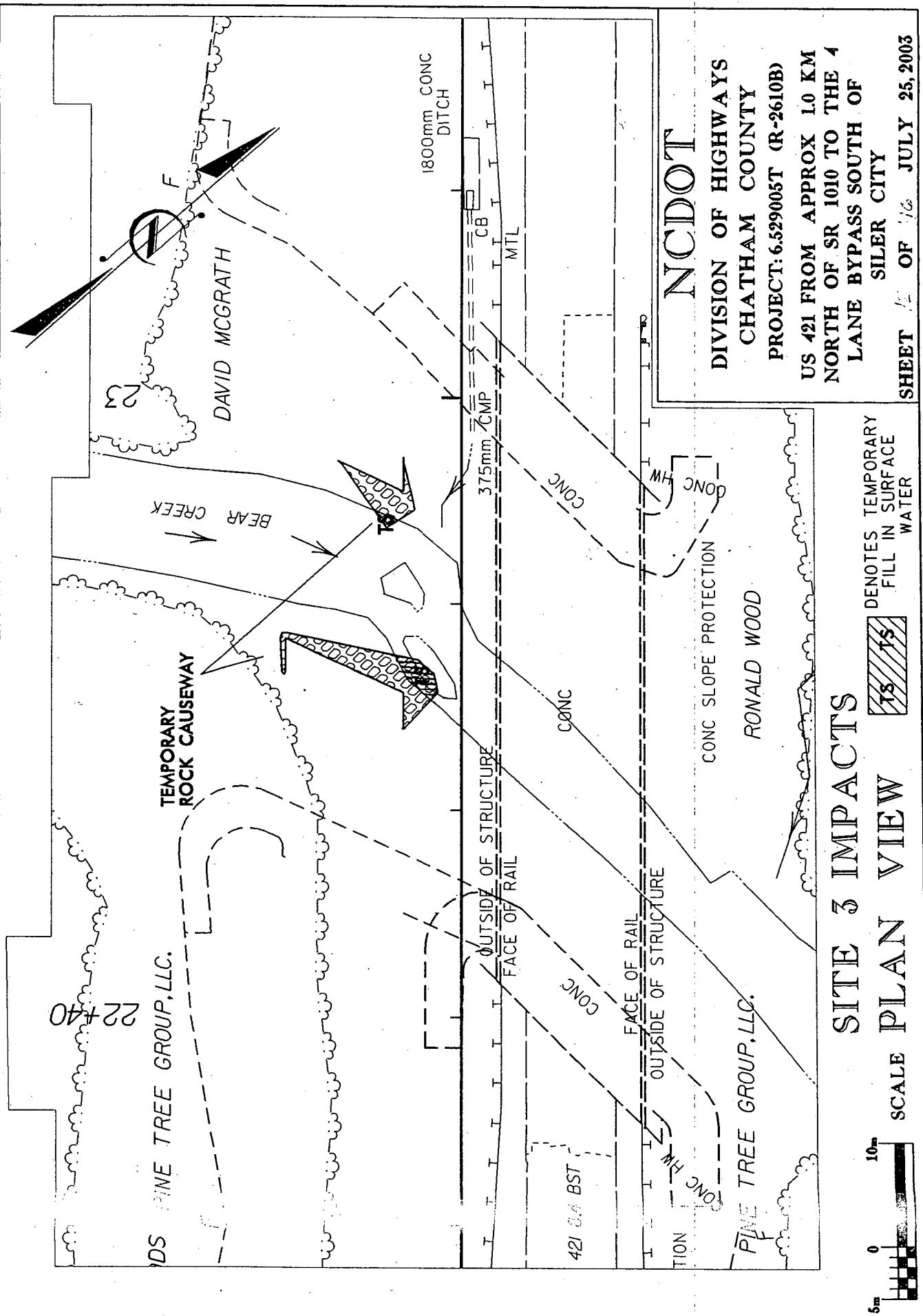
TEMPORARY WORK PAD DETAIL

Note:
The rock pad is to be used for access to the interior bridge bents of Bear Creek and Tick Creek.
The pad locations are as shown in the plan and profile views of the permit drawings.
All Rock placed in the stream and on the stream banks is to be removed.
The leveling course is typically Class "A" rip rap,
but not limited to a particular size.
Reclaimed Rip Rap may be used for slope protection
at the discretion of the Engineer.

NCDOT

DIVISION OF HIGHWAYS
CHATHAM COUNTY
PROJECT: 6529005T (R-2610B)
US 421 FROM APPROX 1.0 KM
NORTH OF SR 1010 TO THE 4
LANE BYPASS SOUTH OF
SILER CITY

SHEET 14 OF 4 JULY 25, 2003



STA 22+83.4 -L- 10.6m LT TO CENTER OF TRAVELWAY
RC DECK ON STEEL I-BEAMS - I@18.0m, I@26.2m, I@18.0m
GRADE PT.EL = 12/626m SKEW = 1/5

123

IN BRIDGE
STA 22+52 +/-

121

119

117

115

-L-

500-yr WSEL = 19.69m ▼

100-yr WSEL =

18.80m ▼

HISTORICAL
HIGH WATER
EL. = 19.69m
19.00m

TEMPORARY ROCK
CAUSEWAY

CLASS 'II'
RIPRAP

113

ROCK

NORMAL WSEL = 13.56m

END BRIDGE
-L- STA 23+14 +/-

CLASS 'II'
RIPRAP TO BERM
BENEATH BRIDGE

1.5/1

1.5/1

1.5/1

1.5/1

1.5/1

1.5/1

1.5/1

1.5/1

1.5/1

1.5/1

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1.5/1

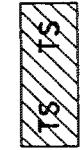
1.5/1

1.5/1

1.5/1

SITE 3 PROFILE

DENOTES TEMPORARY
FILL IN SURFACE
WATER



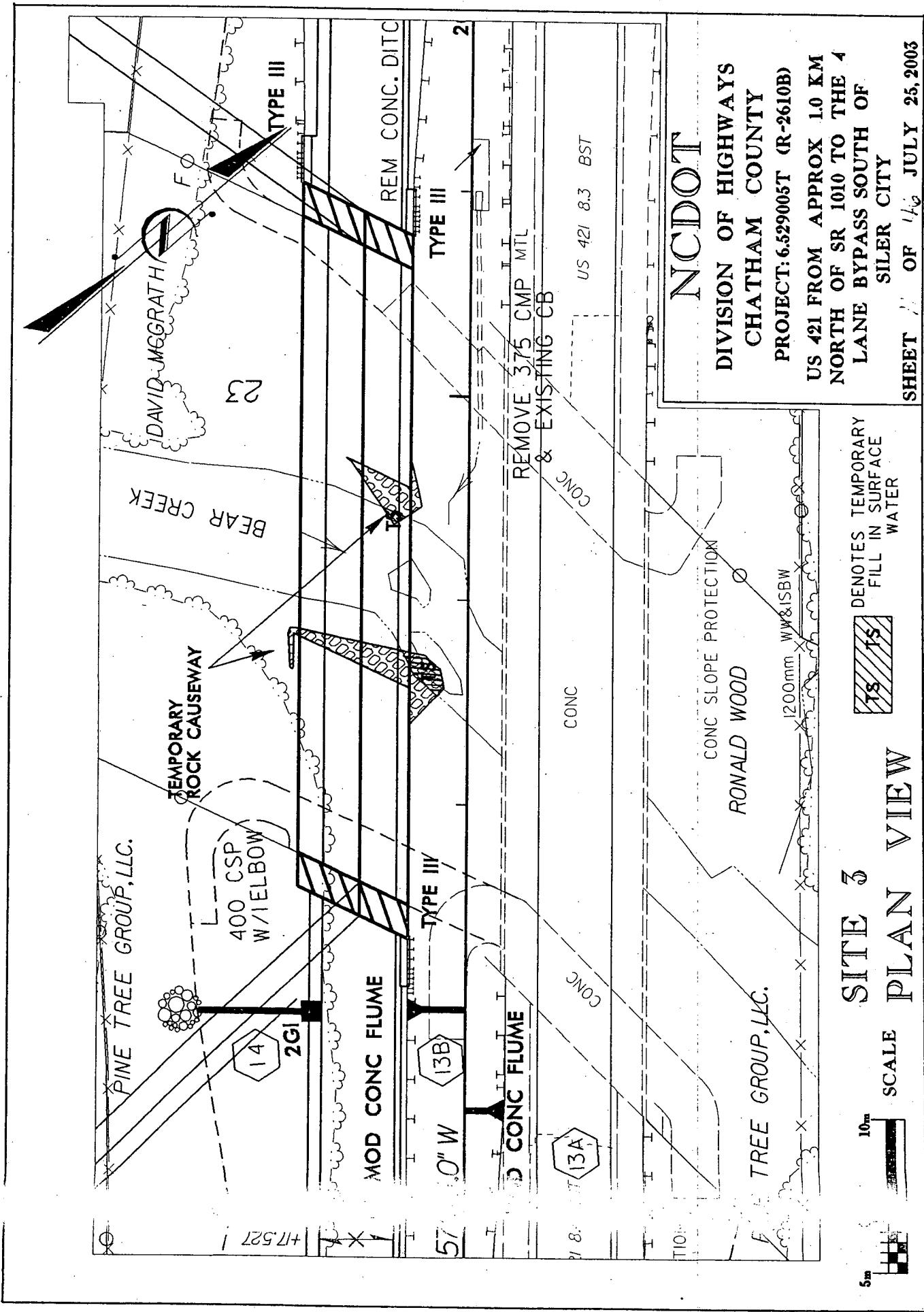
10m SCALE

5m

NCDDOT

DIVISION OF HIGHWAYS
CHATHAM COUNTY
PROJECT: 6529005T (R-2610B)
US 421 FROM APPROX 1.0 KM
NORTH OF SR 1010 TO THE 4
LANE BYPASS SOUTH OF
SILER CITY

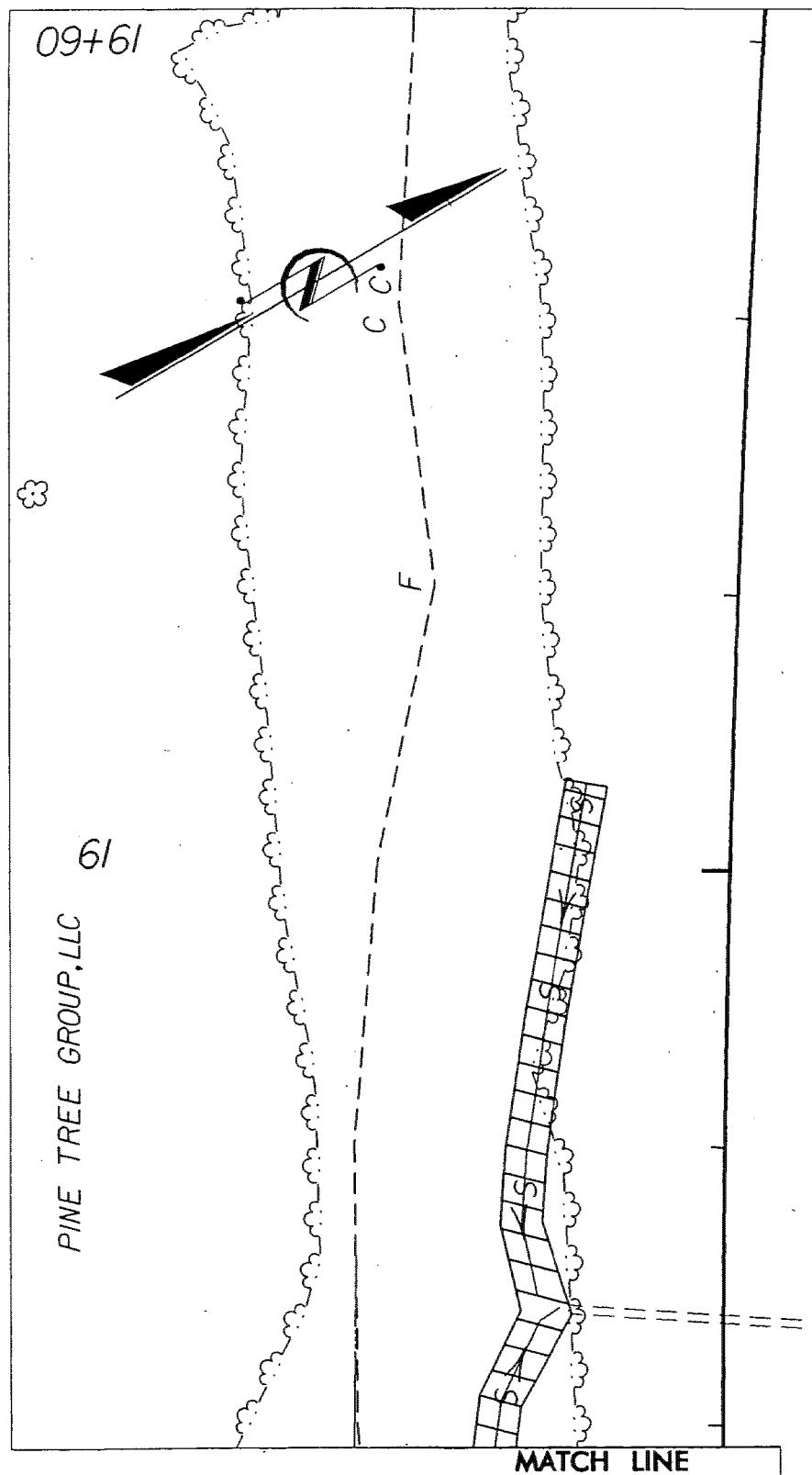
SHEET 13 OF 14 JULY 25, 2003



PINE TREE GROUP, LLC

61

09+61



MATCH LINE

US

116
110
100
PINE TREE GROUP, LLC

US

SITE 2 IMPACTS
PLAN VIEW

10m
SCALE

5m
SCALE

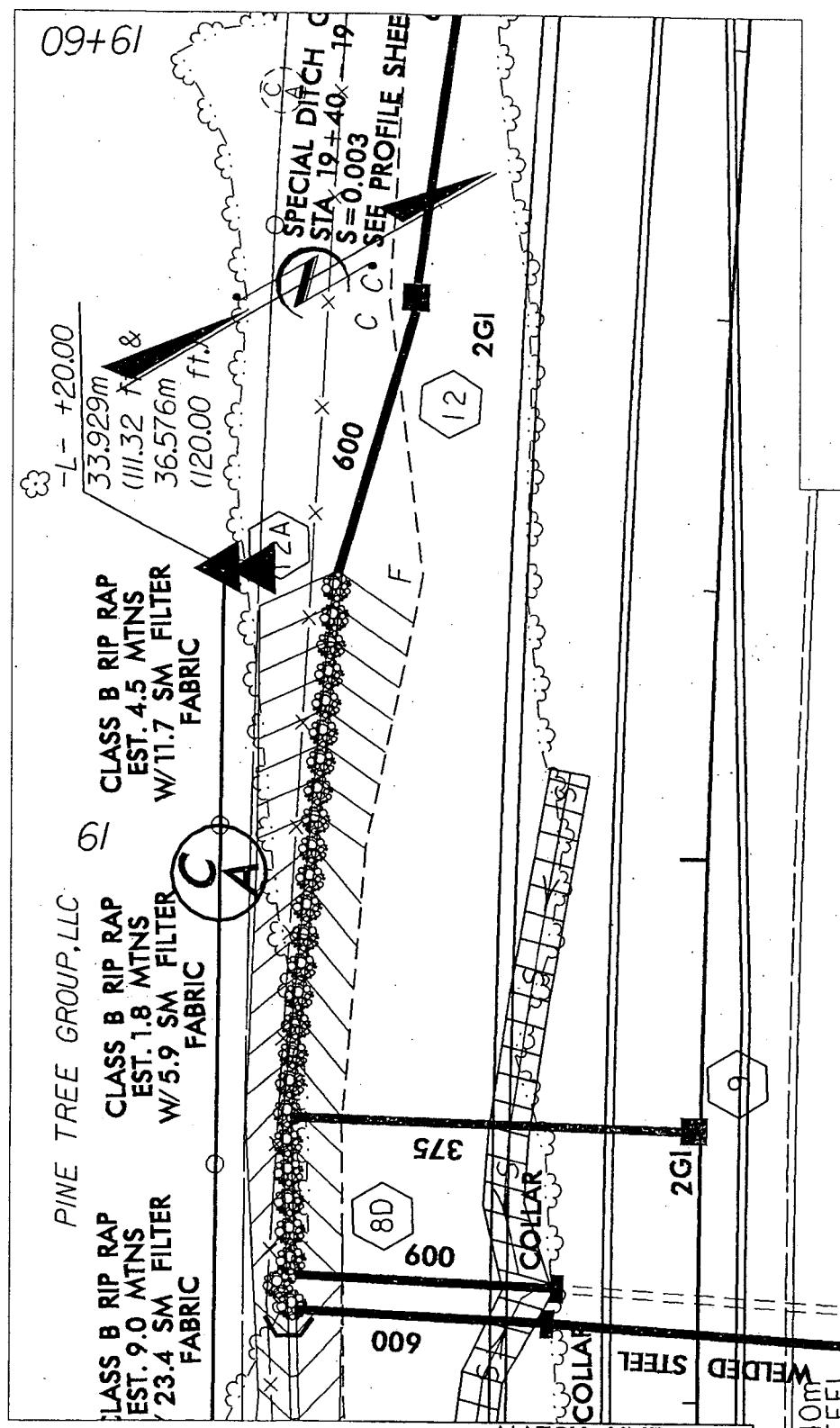
NC DOT

DIVISION OF HIGHWAYS
CHATHAM COUNTY
PROJECT: 6.529005T (R-2610B)

US 421 FROM APPROX 1.0 KM
NORTH OF SR 1010 TO THE 4
LANE BYPASS SOUTH OF
SILER CITY

SHEET 10 OF 10 JULY 25, 2003

5 \$ DENOTES FILL IN
SURFACE WATER



US
PINE TREE GROUP, LLC

NCDOT

DIVISION OF HIGHWAYS
CHATHAM COUNTY
PROJECT: 6.529005T (R-2610B)

US 421 FROM APPROX 1.0 KM
NORTH OF SR 1010 TO THE 4
LANE BYPASS SOUTH OF
SILER CITY

SHEET 2 OF JULY 25, 2003

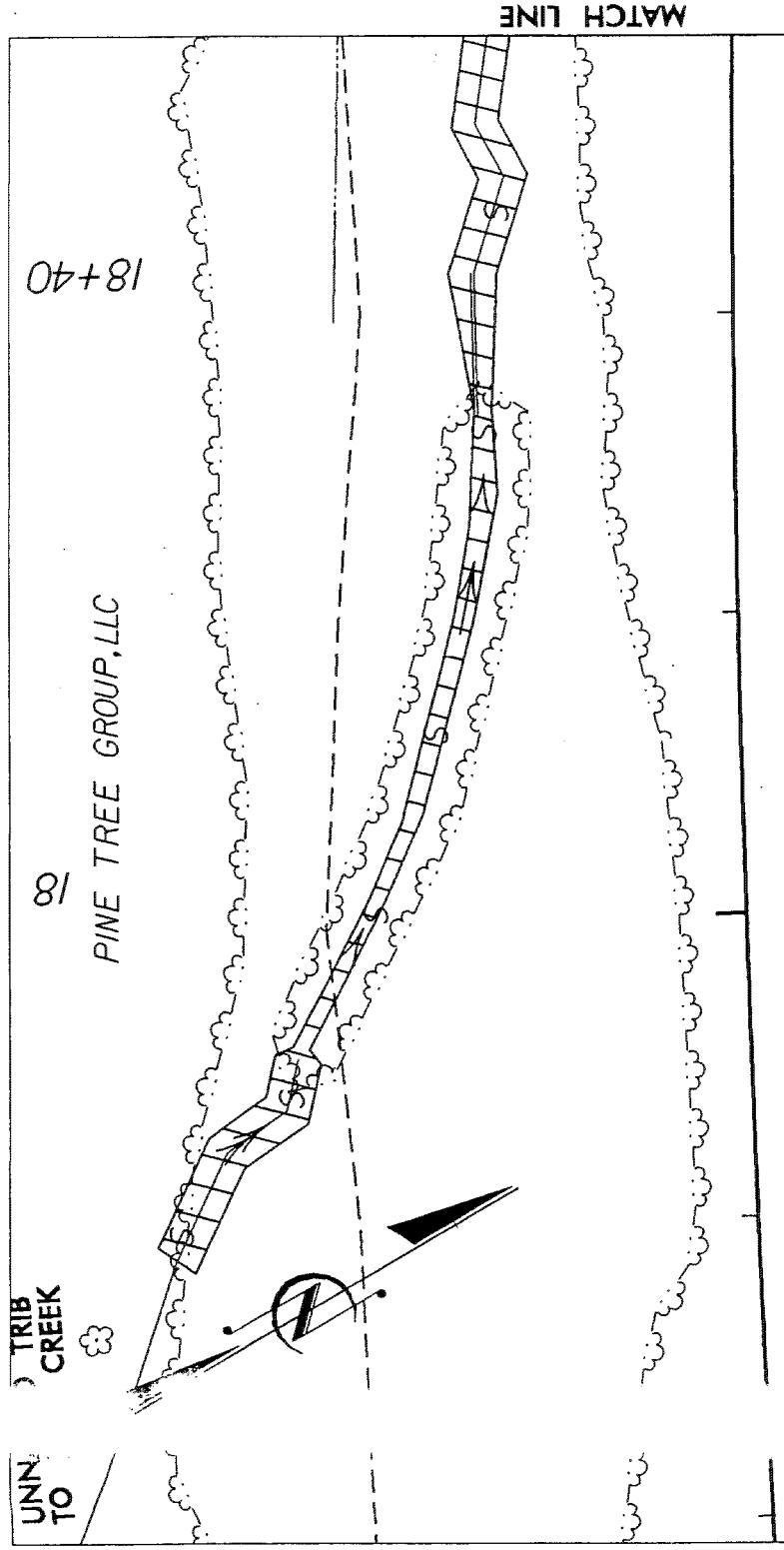
SITE 2
SCALE PLAN VIEW

TRIB
CREEK

18+40

PINE TREE GROUP,LLC

UNN
TO



MATCH LINE

NCDOT

DIVISION OF HIGHWAYS
CHATHAM COUNTY

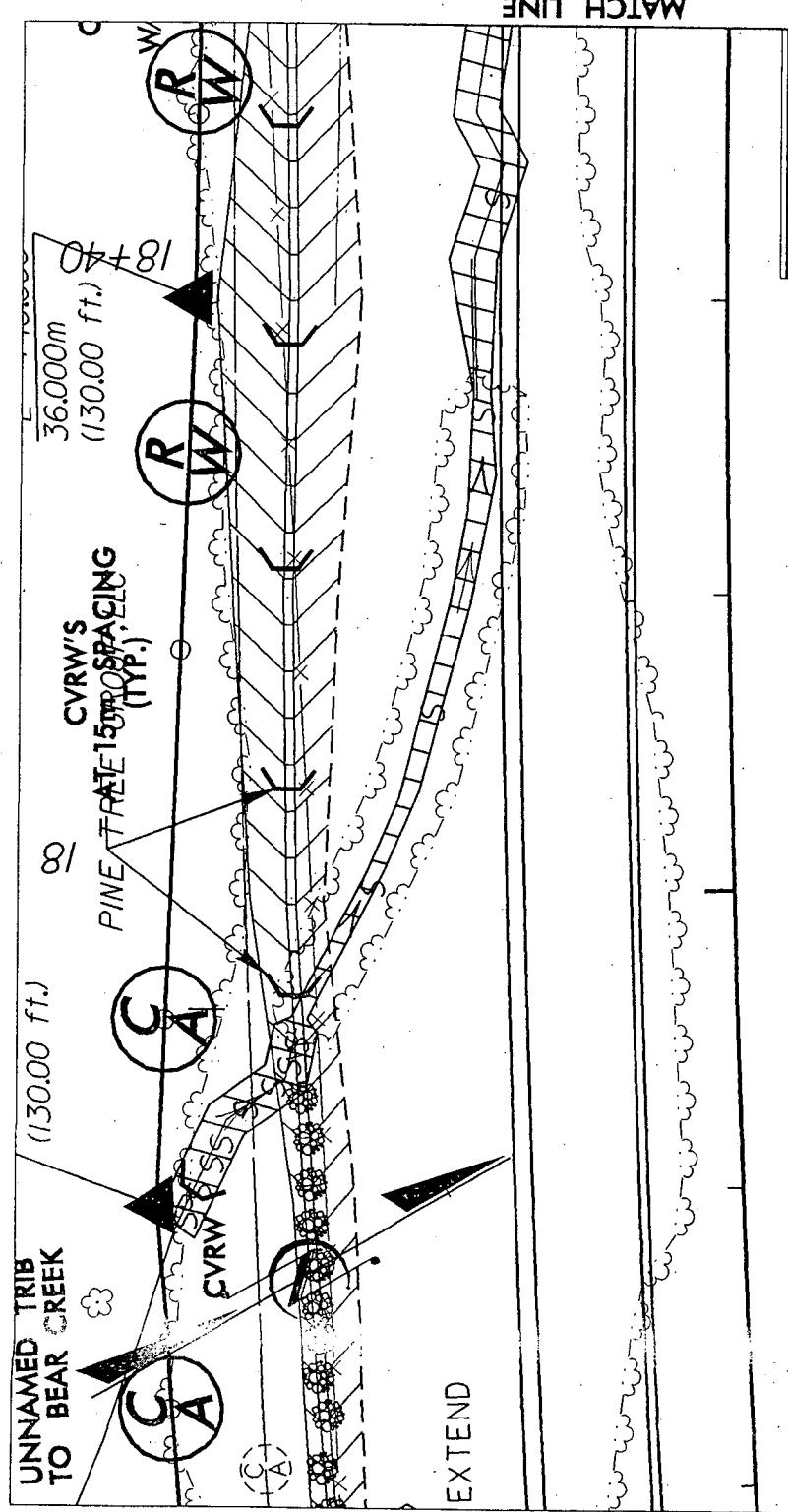
PROJECT: 6.529005T (R-2610B)
US 421 FROM APPROX 1.0 KM
NORTH OF SR 1010 TO THE 4
LANE BYPASS SOUTH OF
SILER CITY

SHEET 3 OF 46 JULY 25, 2003

PINE TREE GROUP,LLC

SITE 2 IMPACTS
PLAN VIEW





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DIVISION OF HIGHWAYS
CHATHAM COUNTY
PROJECT: 6529005T (R-2610B)
US 421 FROM APPROX 1.0 KM
NORTH OF SR 1010 TO THE 4
LANE BYPASS SOUTH OF
SILER CITY

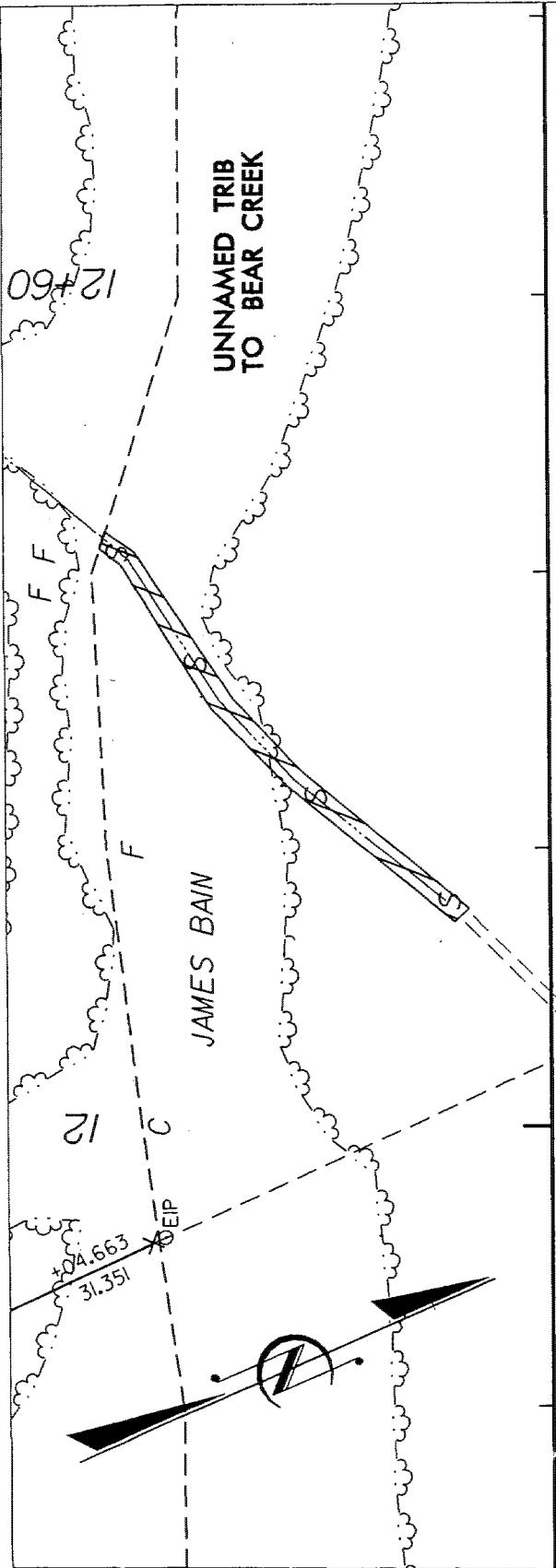
SHEET 7 OF 46 JULY 25, 2003

PINE TREE GROUP, LLC

SITE 2
PLAN VIEW



DENOTES FILL IN SURFACE WATER



UNNAMED TRIB
TO BEAR CREEK

JAMES RIVER

04.663
3.351

US 421 8.5 BST US 421 8.5 BST

WALTER M. DERRETH, JR.

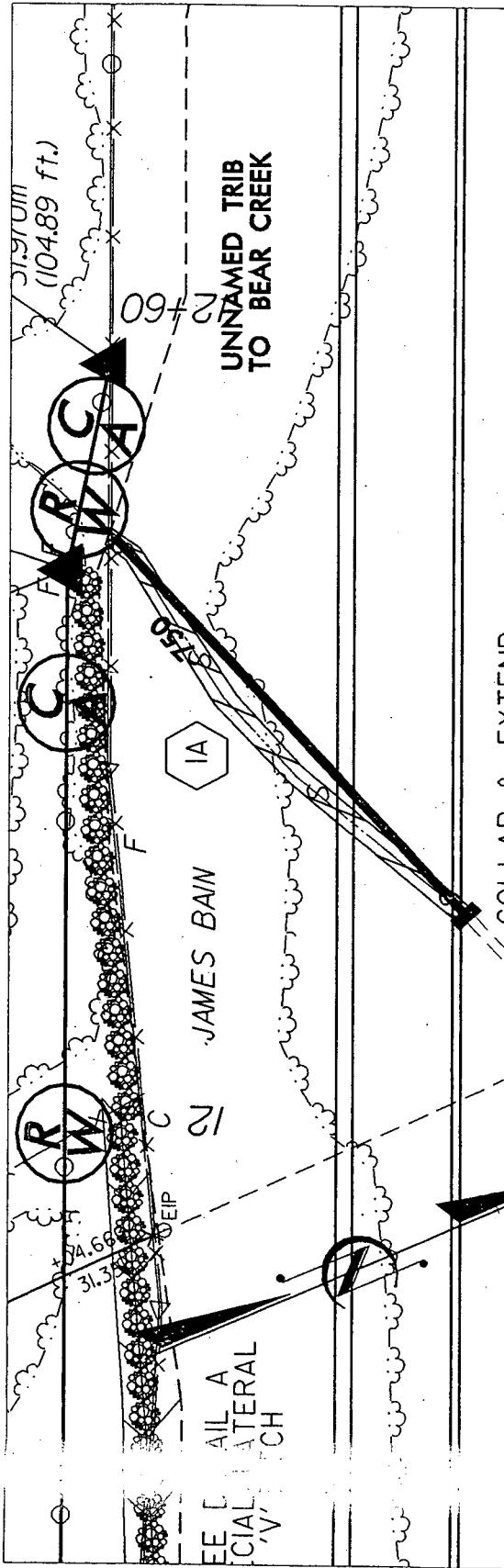
SITE 1 IMPACTS
PLAN VIEW

5 DENOTES FILL IN
SURFACE WATER



NCDOT
DIVISION OF HIGHWAYS
CHATHAM COUNTY
PROJECT: 6.529005T (R-2610B)
US 421 FROM APPROX 1.0 KM
NORTH OF SR 1010 TO THE 4
LANE BYPASS SOUTH OF
SILER CITY

SHEET 6 OF 4 JULY 25, 2003



US 421 8.5 BST US 421 8.5 BST

WALTER M. DERRETH, JR.

SITE 1 PLAN VIEW

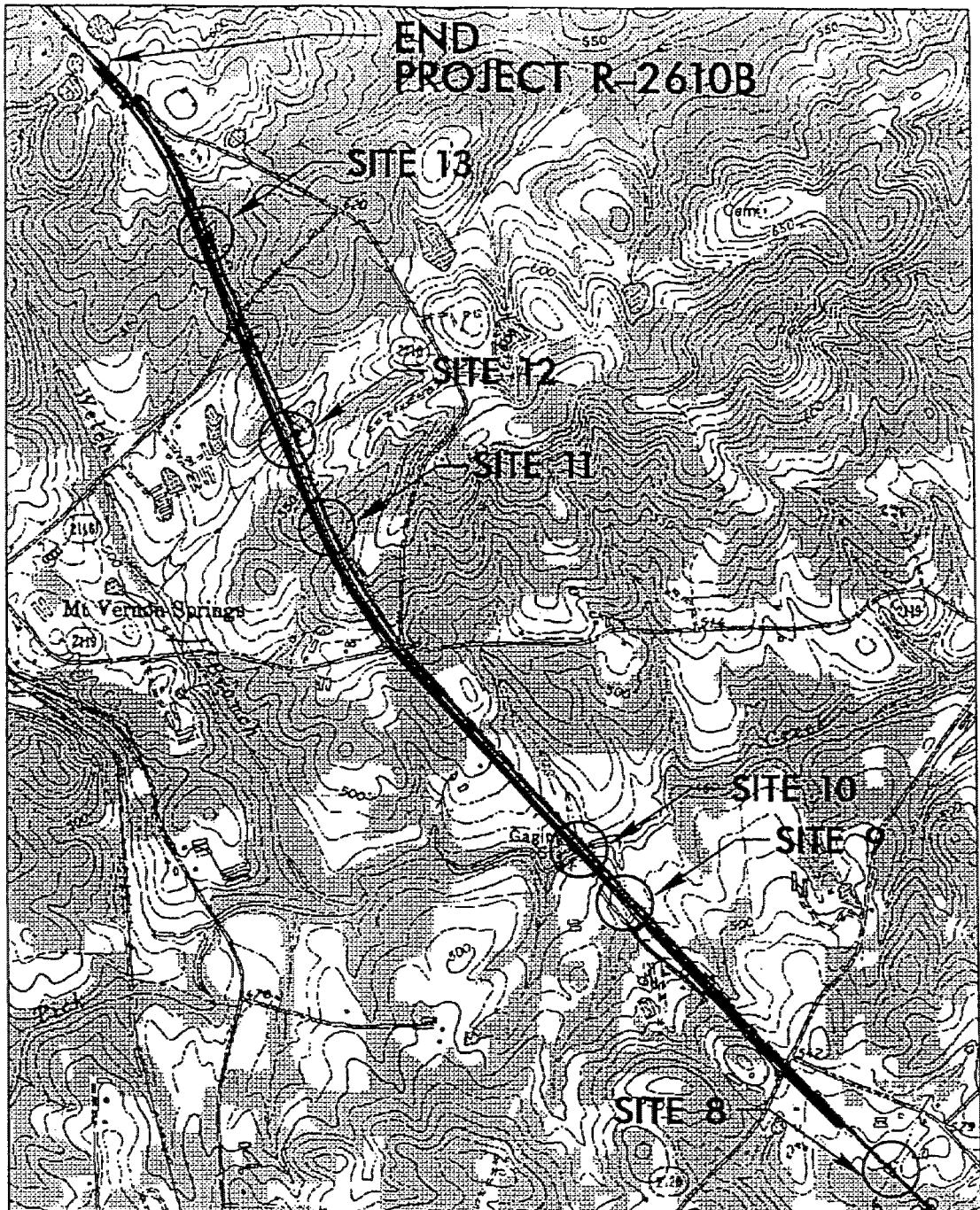
CLASS B RIP RAP
 EST. 7.3 MTNS
 W/ 17.6 SM FILTER
 FABRIC

DENOTES FILL IN SURFACE WATER



NCDOT
 DIVISION OF HIGHWAYS
 CHATHAM COUNTY
 PROJECT: 6529005T (R-2610B)
 US 421 FROM APPROX 1.0 KM
 NORTH OF SR 1010 TO THE 4
 LANE BYPASS SOUTH OF
 SILER CITY

SHEET 5 OF 40 JULY 25, 2003

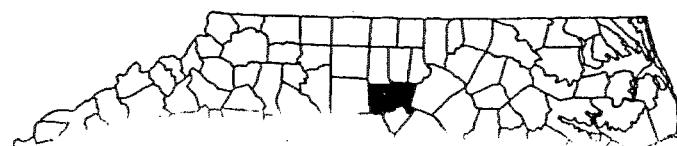


VICINITY MAP

0 $\frac{1}{2}$ 1.0 mile

SILER CITY, NC QUAD MAP

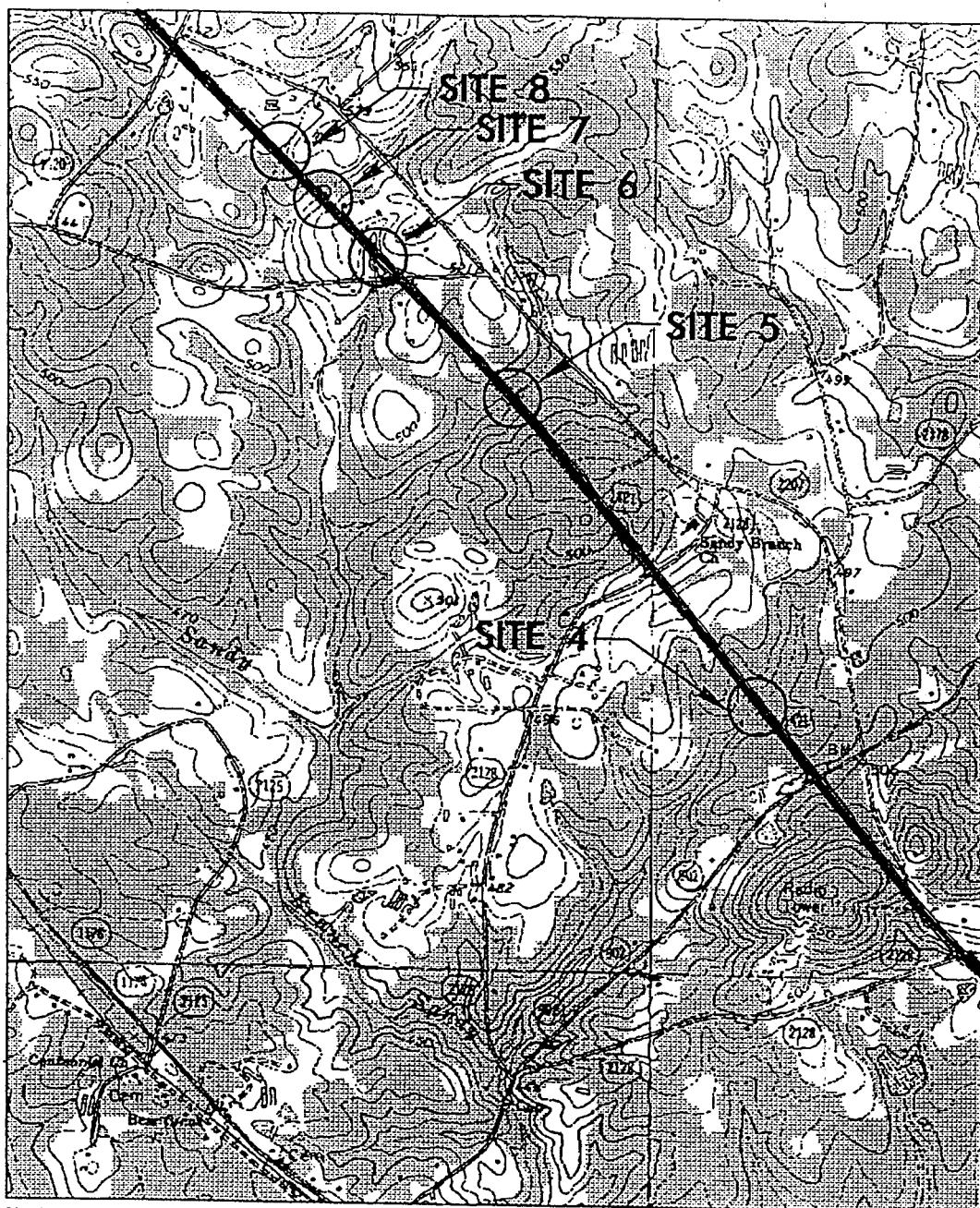
NORTH CAROLINA



NC DOT
DIVISION OF HIGHWAYS
CHATHAM COUNTY
PROJECT: 6.529005T (R-2610B)



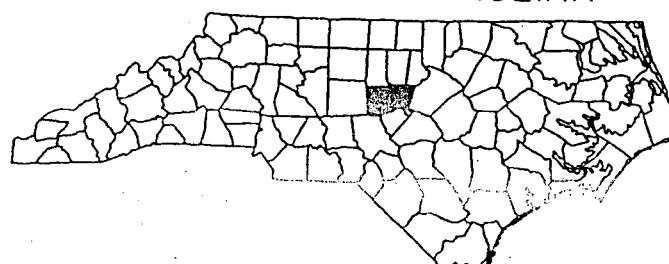
LANE BYPASS SOUTH OF
SILER CITY



VICINITY MAP

0 $\frac{1}{2}$ 1.0 mile

SILER CITY, NC QUAD MAP
SILER CITY NE, NC QUAD MAP
BEAR CREEK, NC QUAD MAP
GOLDSTON, NC QUAD MAP

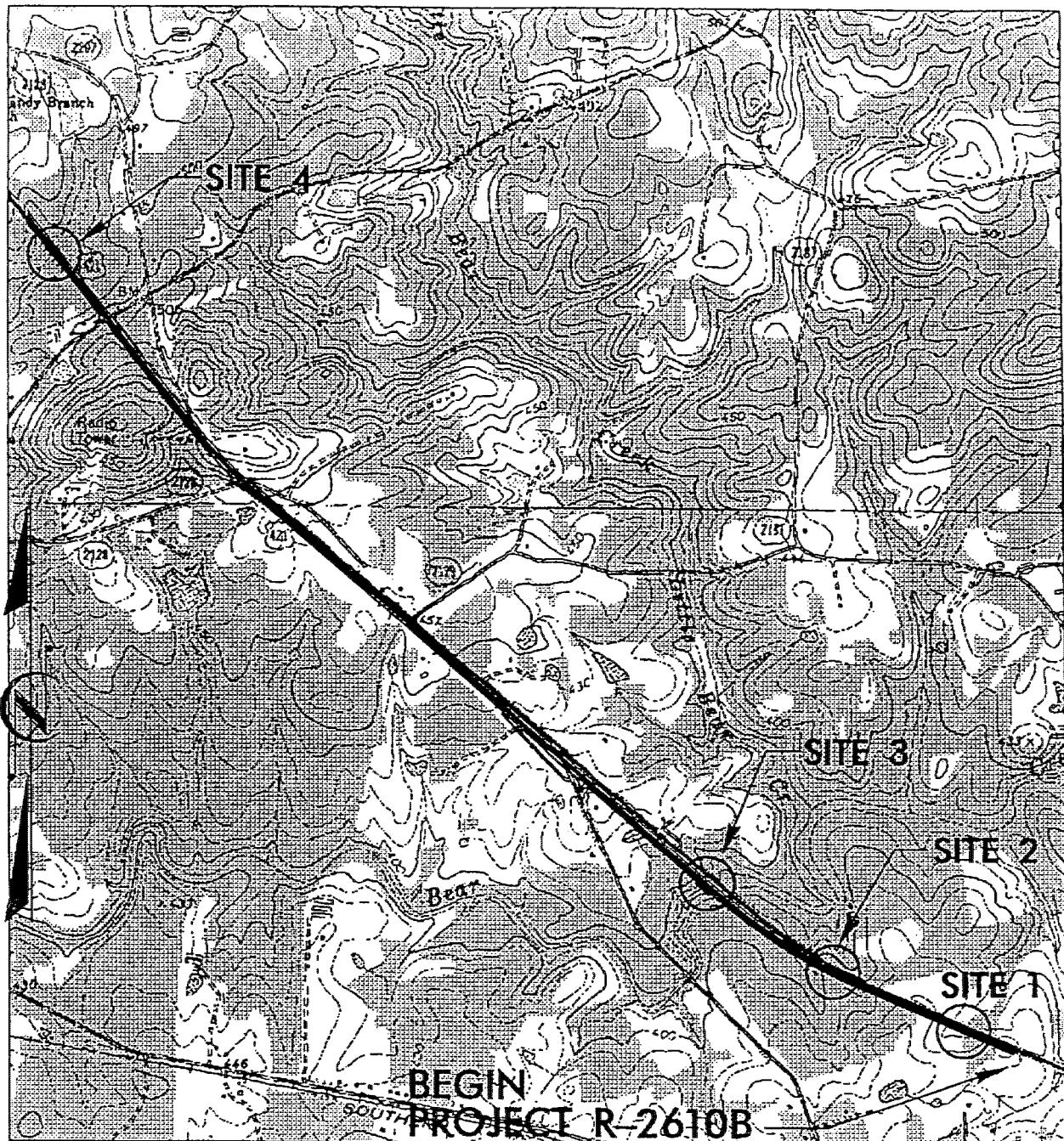


NCDOT
DIVISION OF HIGHWAYS
CHATHAM COUNTY
PROJECT: 6.529005T (R-2610B)

US 421 FROM

PROPOSED LANE BYPASS NORTH OF SILER CITY

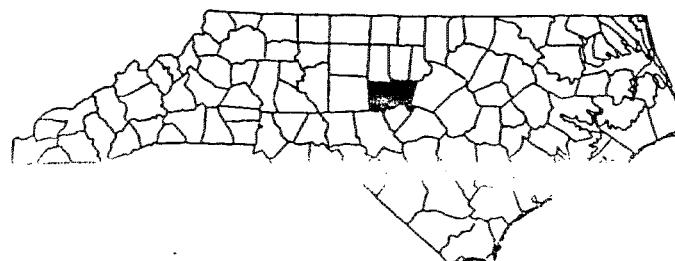
LANE BYPASS SOUTH OF
SILER CITY



VICINITY MAP

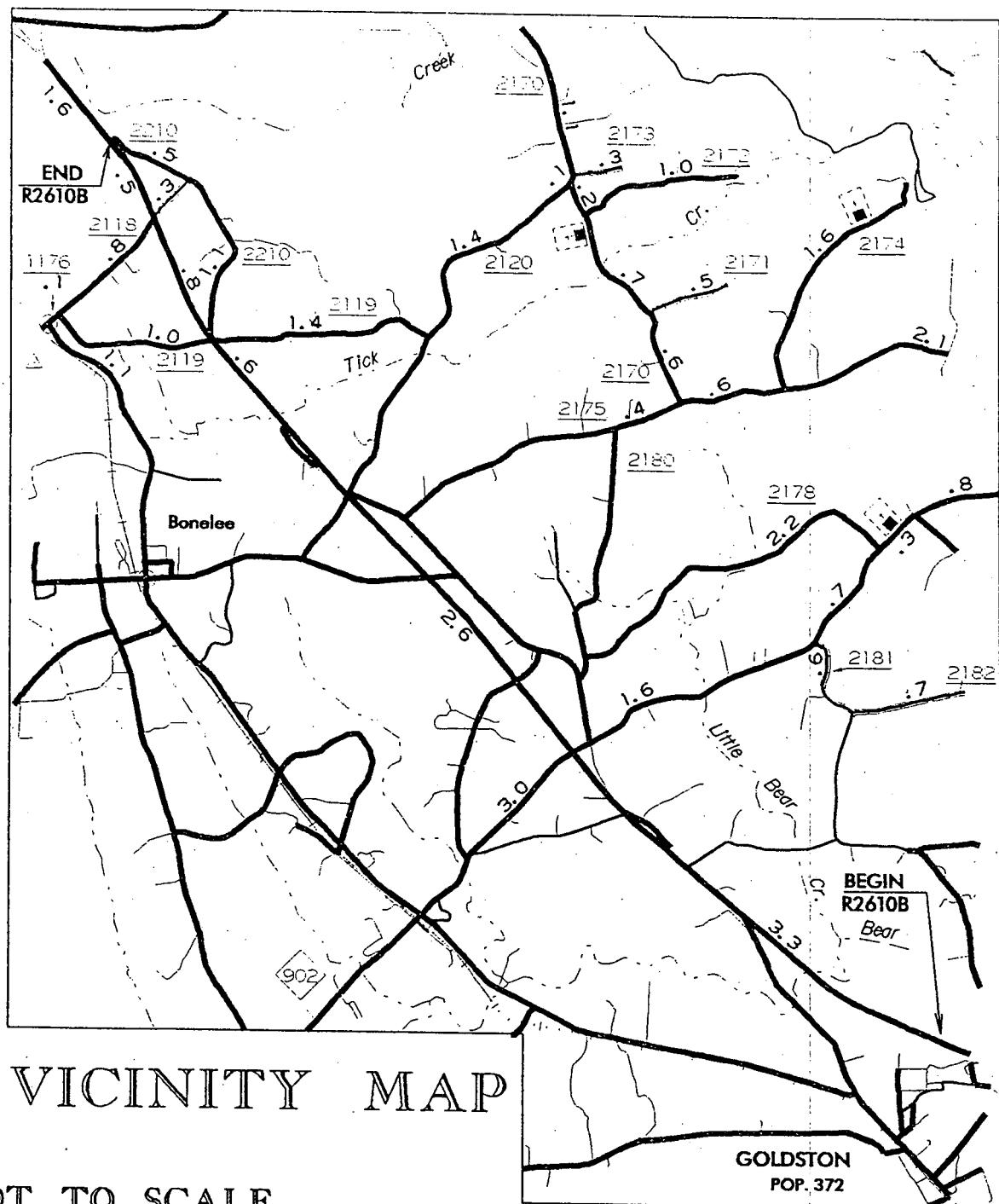
0 $\frac{1}{2}$ 1.0 mile

SILER CITY NE, NC QUAD MAP
GOLDSTON, NC QUAD MAP



NCDOT
DIVISION OF HIGHWAYS
CHATHAM COUNTY
PROJECT: 6.529005T (R-2610B)
US 421 FROM APPROX 1.0 KM

LANE BYPASS SOUTH OF
SILER CITY



VICINITY MAP

NOT TO SCALE

A map of the state of North Carolina showing its county boundaries. The county of Robeson is highlighted with a solid black dot.

NCDOT
DIVISION OF HIGHWAYS
CHATHAM COUNTY
PROJECT: 6.529005T (R-2610B)

**US 421 FROM APPROX 1.0 KM
NORTH OF SR 1010 TO THE 4
LANE BYPASS SOUTH OF
SILER CITY**

IMPACT SUMMARY

English Summary

**N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS**

PROJECT: 6.529005T (R-2610A)
US 421 WIDENING

12/29/2003

SHEET OF

Final Revised 3/22/01